WELL-SPRING OF SCIENCE

TEACHING

The perfect worke and practise of ARITHMETICKE both in Numbers and Fractions

Set forth

By HUMFREY BAKER *Londoner.*

And now againe perused, augmented and amended in all the Three Parts by the said Author.

Whereunto are also added certaine Tables of the agreement of Measures and Weights of divers places in EUROPE the one with the other, as by the TABLE appeareth.

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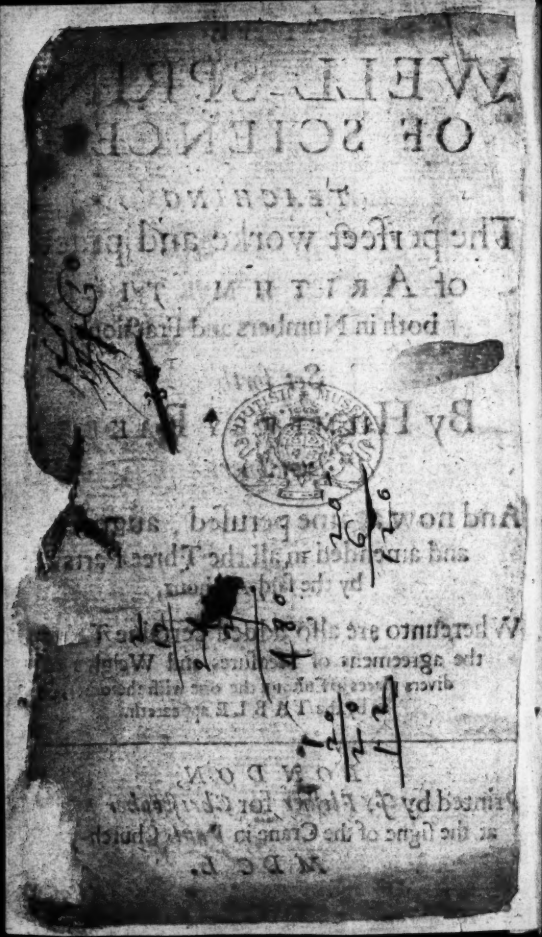

To the right Worshipfull the Governour, Assistants, and the rest of the Company of Merchants Adventurers.

HUMFREY BAKER *Londoner, wisheth health with continuall increase of commodity by their worthy travaile.*

IF the knowledge of ARITHMETICK, Right Worshipfull, were of so small profit in the life of man, or so little used in our worldly affaires, that it might be well left, or but seldome frequented, it were well done by the Professors thereof, to pen very long and eloquent Orations, in setting forth the commendation of the same. But since experience hath taught to be true the old proverb, That where good wine is to sell, there need no garland be hanged out: Me thinketh they doe great injury unto Arithmetick, that seek to heare the commodities thereof set forth in a short Epistle: and surely they overcharge me in laying such a burthen on my back as were too importable for the greatest Oratour. For the skill hereof is well knowne, immediatly to have flowed from the wisdome of GOD, into the heart of man, whom he hath created the chief image and instrument of his praise and glory, enabling himselfe unto him so farre as he judged convenient: whom notwithstanding he could not conceive to remaine in the most secret mystery of Trinity in Unity, were it not by the benefit of most divine skill in numbers, which skill as also the most full and effectuall knowledge of all other things unspeakable, GOD used in his wonderfull Creation of all the world out of nothing, which he accomplished within the compasse of certaine number of dayes, expressing moreover, what he made in every day, and of certaine his creatures how many he made, as appeareth in the booke of *Genesis*, written by inspiration of the Holy Ghost, wherein the divine majesty of GOD could not be knowne unto us without the knowledge of numbers, nor *Moses* have understood what himself had written. And *Salomon* the wisest man that ever was, considering the very depth of all things within his

nesse, to whom God had given a greater gift of wisdome, than to any man either before or since, doubted not to breake forth in these words, saying, Thou O Lord hast disposed all things in measure, number and weight, for this he present him to judge; who in another place testifieth how that he hath searched deeper into the causes & knowledge of all things, than any other man in the world.

These testimonies (Right Worshipfull) doe manifestly teach us, what we ought to thinke of the cause, and originall of Arithmetick, and partly also how necessary it is in the life of man, that unlesse by nature, we have some feeling and understanding therein, we are no better than Beasts, & in this respect worse, for that we retaine not that whereunto we are as specially born, as naturally they doe, some to running, some to smelling, some to hearing, some to flying, and some to swimming. Take away Arithmetick, wherein differeth the Shepheard from the Sheep, or the Horse-keeper from the Asse? Surely but only in shape and figure, which as the learned affirme, is a very slender cause of difference. Wherefore not without just cause have the ancient Fathers, and Philosophers singularly extolled the knowledg of Arithmetick, diligently training up their youth therein, as in a science most necessary of it selfe, considering the deep devises, the profound practises, and cunning conclusions therein contained; and also that it is the Key and entrance into all other Arts and Learning: as well approved the Noble Philosopher *Pythagoras*, who caused this Inscription to be written upon his Schoole-doore (where he taught Philosophy) in great Letters, NEMO *ARITHMETICAE* IGNARUS HIC INGREDIATUR; Let none enter here that is ignorant in Arithmetick; Which saying, as it is proper and peculiar into all sorts of men in the beginning and entrance into all liberall knowledge and Faculties to be ensued and embraced, so surely above all other it is, next after the Word of God, most fit and necessary that it should be written upon your Schoole doores. (Right Worshipfull) whose Trade and Travaile is imployed in the Noble Traffique of Merchandise, wherein you have need of continuall recourse unto this excellent Art. The daily exercise whereof, hath so sharpned your judgments, and ripened your understandings, that most of you are become singular therein, both to deale that way your selves, and to judge of other mens doings. And herein I am sure you are good Witnesses with me how foolish and vain is their opinion, which beside your most commendable affaires, suppose and affirme that Arithmetick is of small use unto any other men, seeing

that

that the Lawes of sundry Realms well instituted and guided, have deservedly accompted for Fooles, and unfit Members, (to Rule or deale in a Common-wealth) all such as wanted the skill of naturall Arithmetick, deprived them both of Lands and living: which as it tendeth to no small praise and credit of Arithmetick, so am I constrained for brevity sake in few words to overpasse both that and others which might be said in commendation thereof. Shortly admonishing your Worships, that whereas in times past, as is well knowne, I had travailed in a Booke in English of that Faculty dedicated unto you; being now enforced to run over the same, both amending and augmenting it with sundry Additions. I am so bold againe to attempt your Worships with the acceptation thereof, hoping that as in foretime ye have taken it such as it was, ye will now also daigne to receive it, being in better case (I hope) than ever it was, a token of my good will, howbeit a simple thing, wherein you may weigh the heart and not the gift, proceeding from such a Fountaine, that if better skill and knowledge had been matched to my good meaning, it should have been done otherwise to the better contentation of your worthinesse. And therefore in the meane season untill it please God to furnish me in such sort, I rest in daily prayer unto him, to maintaine your Fellowship in happy estate, and to blesse your purposes with lucky successe, to guide your voyages with wished increase, and to season your doings with all kinde of vertue, and to preserve your lives with desired health to his will and pleasure.

To the READER.

HAving (gentle Reader) published in print one English booke of Arithmetick containing as I suppose, sundry profitable documents for such as desire any knowledge therein, I have been often since that time, and of very late also, requested by sundry of my Friends, to peruse the same work, and as I should now judge it expedient, to adde something more thereunto, and to amplifie the same. Which earnest and friendly suite of theirs, for certaine just causes seeming needfull unto me, surely I could in no wise deny. For when I perceived the importunity of certaine Strangers, not borne within this Land, at this present, and of late dates, so farre proceeding, that they advanced and extolled themselves in open talke and writings, that they had attained such knowledge and perfection in Arithmetick, as no English-man the like. Truly me thought that the same report not onely tended to the dispraise of our Country men in generall, but touched especially some others and me, that had travailed and written publickly in the same faculty. For unto this same effect they have of late painted the corners and posts in every place within this City with their prevish Bills, making promise and bearing men in hand, that they could teach the summe of that Science in brief Method and compendious Rules, such as before their arrivall, have not been taught within this Realm, Whose sayings to be false, and writings untrue, if I were thereto required by men of Authority I am well able to prove; and that more is (be it spoken without envie, or thirst of praise) even within this same Booke, if it may please thee to make triall, are generall precepts and Rules to be found, such as they can bring forth neither briefer nor better. But this is no rare thing, since in other matters of greater importance, their attempts are too too perilous, and their deeds outragious, well deserving restraint and banishment, against one of whom, verily not of mine owne accord, but constrainedly, I have been enforced to sharpen my pen, for that he, as I heare say, continueth in dispraise of our Nation, saying, That we are unskilfull in those Rules that he teacheth, and himselfe excellent in the knowledge of Arithmetick: Wherein if true triall might be indifferent Judge, I doubt not but he would be found to have least skill of a great many: of whom perhaps, if I should write upon report of others, I could say somewhat more, which would (if it were true, and be knowne) redound unto his utter discredit, which for this cause I omit to doe, lest the crime of arrogancy might be thought to rest within me, which I object against him; howbeit, thus much I dare affirme, that there are divers in this honorable City, who

although

although they advance and extoll not themselves (so malepertly) as these sort of men are accustomed to vlot in all that they possesse, yet do far surpasse them, as well in the knowledge of numbers as in all other kinde of learning and skilfulnesse. Another cause also there is of this present Edition, as it seemeth to me very just and necessary, for when a certaine Welwiller of mine purposing to imploy some time in bettering his knowledge in Arithmetick through the reading of this present Booke, did certifie me, that he in perusing the same had espied so many errors committed in the printing, that he could gather no truth thereby: I was not a little moved thereat, since that by the disordering thereof, neither the worke attained his true meaning neither could the Learner attaine his desired knowledge; and surely no marvaile, for I am credibly informed, since it passed out of my hands, it hath been oftentimes printed without the view of a skilfull Corrector, unto the great discredit of the Authour. These and such like considerations, urging me forward, and not forgetting the feuit, loving Reader, that may grow unto thee hereby: I have taken in hand both to amend and to augment the same, seasoning (as it were afresh) all three parts of the worke with divers Questions and Examples, very necessary and profitable; having also for thy commodity added unto the end of this Booke divers and sundry Tables of the agreement of Measures and Weights of sundry places reduced to an equality the one to the other. Unto thee therefore my request is thankfully to accept the same, and in good part, wishing well to him that travaileth for thy benefit, not disdaining it in respect of grossnesse of the style, or rudenesse of utterance; since that this Science requireth not eloquence of writing, but plainnesse of teaching, and truth in working of divers Conclusions by Numbers onely, desiring thee, if thou be willing to profit hereby, first friendly to amend the Faults that have escaped in the printing of the same, and then to begin at the entrance of the Booke, and so orderly proceeding forward unto the end, not turning unto the midst or last part thereof until thou perceivest well that which went before, and so doing, thou shalt not onely attaine to the perfect knowledge of the whole effect, but be able also by thine owne labour and industry to understand all other Bookes of Arithmetick, whatsoever: and thus I bid thee farewell heartily.

An

An Advertisement touching this Edition.

THE friendly Reader may please to take notice that in this impression of 1645. the whole Booke hath been revised, every Question therein examined, the Faults that were committed in former Impressions Corrected, the whole restored to its first integrity. The Tables of Weights and Measures at the end of the Booke according to the Authors Supposition, that is, as they are all compared with the Weights and Measures of *London*, with much labour examined: The Fractions which before were in the common way (and to the figure being small in many not discerned) are put into the decimall parts, and so the same with the integrall, but farre more true than the common Fractions can expresse it in one figure, and if in the common it be expresst in many (as it must be if true) then the decimall is far more easie, because the Denominator is one and the same to all, whereas the other is differing.

I shall not need to adde any thing in praise of the Booke, the many Impressions that have been made thereof may save me that labour; the taske I undertooke was to Correct what was amisse, which I have done with all faithfulnesse, and so commend it to thy friendly acceptance. Farewell.

THE

THE DEFINITION of NUMBER.

NUMBER, is as much to say, as a multitude, composed of many unities, as two is composed of two unities, three is composed of three unities, foure of foure unities, five of five unities, ten of ten, foureteene of foureteene, fifteene of fifteene, twenty of twenty unities, &c.

And therefore an unity is no number, but the beginning and originall of number, as if you doe multiply or divide an unity by it selfe, it is resolved into it selfe without any increase: but it is in number otherwise; for there can be no number how great soever it be, but that it may continually be increased, by adding evermore one unity unto the same.

Chap. 1.

Numeration.

NUMERATION is the art whereby to expresse & declare the value of any Summ proposed: and is of two kinds: the one gathereth the value of a Summe proposed, and the other expresseth any sum conceived by due figures and places, for the value is one thing, and the figures are another thing: and that cometh partly by the diversity of figures, but chiefly of the places wherin they be orderly set. And therefore you must first marke, that there are but ten figures or characters wch are used in Arithmeticke, whereof nine of them are called signifying figures, and the tenth is called a Cipher, which is made like an O, and of it selfe signifieth nothing, but if it be joined with any of the other figures, it increaseth their value, and these be they.

1 2 3 4 5 6

one two three fowre five six,

7 8 9 0

seven eight nine a Cipher.

Also you shall understand that every one of

of theſe figures hath two values: One is alway certaine and hath his ſignification of his owne fourme, and the other is uncertaine which he taketh of his place.

A place is called a ſeat or roome that a figure ſtandeth in, and how many figures ſoever are written in one Sum, ſo many places hath the value thereof: one that is called the firſt place (which is next toward the right hand) of any Sum, and ſo reckoning by order towards the left hand, ſo that that place is laſt which is next the left hand. And contrariwiſe, when you expreſſe the value of the figures in any Sum, you muſt begin at the left hand, and ſo reckon towards the right hand.

Every of theſe nine figures (which are called ſignifying figures) hath his owne ſimple value when he is found alone, as in the firſt place of any Sum. In the ſecond place toward the left hand, he betokeneth his owne value ten times: as 70. is ſeuen times ten, that is to ſay, ſeuenty. 80. is 8 times 10. that is to ſay, eighty. In the third place every figure betokeneth his owne value a hundred times: as 700. in that third place betokeneth an hundred times 7, that

is to say, 7 hundred. In the fourth place e-very figure betokeneth his owne value a thousand times: as 7000, is seven thousand, and 8000, is eight thousand, these fower first places must be had perfectly in mind, yea and that by heart as they say, for by the knowledg of them you may expresse all kind of numbers how great so ever they bee.

In the fift place, every figure betoken-eth his owne valu ten thousand times: as 70000, is ten times seven thousand, that is to say, seventy thousand. In the sixt place, every figure standeth for his owne value, a hundreth M. times: as 700000, is seven hundred thousand. The Seuenth place, M, M, times, or a Million: as 7000000, is seven M, M, or seven Millions: and the eight place ten M, M, times, or ten millions: so that every place toward y left hand, exceedeth the former ten times. But now for the easie reading, & ready ex-pressing orderly of any summe proposed, you shall practise this manner following: note for example. I propose this number 76543658, In the which are 8. places. In the first place is 8, and betokeneth but

eight,

eight, that is to say, once his own value: and the second place is 5, and betokeneth ten times five, that is fifty: in the third place is 6, & betokeneth an hundred times six, that is 6 C. In the fourth place is 2, and that is two M. And 3, in the 5 place, is ten M. times 3, that is 30 M. So 4 in the first place is C thousand times 4, that is foure C. M. then 5, in the seventh place is a M, M, times 5, that is five M. M, or rather five Millions: and 6, in the eight place is six times ten Million, that is, Lx. millions: and last of all 7 in the 9. place is vii. C millions: now followeth the practise. First put a pricke ouer the fourth figure, & so ouer the tenth: and also ouer the 13, 16, or 19, if you have so many, and so still leaving two figures betweene every prickes, and these roomes from one pricke to another, are called Tervaces, then you must pronounce every three figures from one pricke to another, as though they were written alone from the rest: and at the end of their value ad so many times a thousand, as your number hath prickes: (that is to say) if there be but 1 pricke, it is but 1 M: if 2 prickes, 1 M. M. or else a million: if 3

pricke one M. M, M, or a M. millions: and so consequently of all other figures following: then come likewise to the next 3 figures, & sound them as if they were apart from the rest, and adde to their value so many times thousands, as there are prickes betweene them and the first place of your whole number: and so doe by the next 3 figures following, and all the rest likewise: as in example, 4 5 1 2 3 4 6 7 8 5 6 7. The first pricke is over 8, in the fourth place, which is the place of a M. The second pricke is over 4, in the seventh place, which is the place of a M, M, or one million: the third pricke is over the 10 place, which is the place of a M, M, M, or of a M, millions, as in the former example. Then for the expressing of this number by the value of every figure, according to the place wherin they stand, you shall first beginne at the last pricke over 1 and take it, and the other two figures 5, and 4, which are behinde the said 1 towardes your left hand, and value them alone, and they are foure Cli. M, M. M, or else CCCCli, M, millions: then take the other three Figures from 1, to the next pricke toward your right hand,

hand, and value them as if they were a part from the other, and they are 234, which doe signifie CCxxxiiij Millions, or 234 M M. Then come to the third pricke over 8, and take the other two figures behinde it, & reckon them likewise as if they were alone, and they are six Clxxxiij M. And last of all, come to the other three figures which remaine, that is 567, and they are five Clxvij. Thus the whole sum of these figures, is to wit CCli M, two Cxxxiiij Millions, six Clxxxiij M, five Clxvij, as before.

Note also, that whole number is divided into three kinds, that is to say, Diget number, Article number, & Mixt or Compound number. The Diget number, is all manner of numbers under ten, which are these nine figures, 1, 2, 3, 4, 5, 6, 7, 8, 9, of the which I have spoken before. The Article number is any kind which hath in the first place a Cipher, as this 0, and they may ever be divided just by 10. without any remaine, as these 10, 20, 30, 40, 50, 100, and all other such like. The Mixt or Compound number containeth divers and many Articles, or at the least one article, and a diget, as 11, 12, 16, 19, 22, 38, 108,

1007, and so forth. And as any article number may be made a compound, by putting thereto a diget, even so likewise every compound number, may be made an article number, by adding thereunto a 0.

Heere followeth a briefe rehearsall of the Order and Denominators of the places. And this shall bee sufficient for Numeration.

The order of the places.										The Denominators of the places.
Tenth.	Ninth.	Eight.	Seventh.	Sixt.	Fift.	Fourth.	Third place.	Second place.	First place.	
4	3	2	1	0	1	8	3	4	5	
M. of Millions.	C. of Millions.	X. of Millions.	Millions.	C. of Thousands.	X. Thousands.	Thousands.	Hundreds.	Tenths.	Unities.	

Chap. 2.

Addition in whole NVMBER.

ADdition, is as much as to bring together 2 sums or more into one, as if there were due to any man 223 l. by some one body: and 334 l. by another, and 431, by another: if you would know how many pounds are due to the same man in all: these three sums shall you set downe orderly the one under the other, writing the greatest sum highest, and the next to the greatest under it, and the least sum under the last, in such sort that the first figure of the one sum towards your right hand, be directly under the first figure of the other, and the second under the second, and so forth in order.

When you have thus done, draw under them a straight line, and they will stand thus:

431
334
223

Now beginne alwayes at the first places towards your right hand and put together the three first figures of the first places of these three summes, and

looke what commeth of them, and write that under them beneath the line, as in saying 3, 4, and 1, being put together doe make 8: write 8 under 3, as héere you sée.

431
334
223
8

And then goe to the second places of figures, and do likewise: as in saying, 2, 3, and 3, make 8, write 8 under 2, as héere you sée.

431
334
223
88

And doe likewise with the figures that be in the third place, in saying, 2, 3, and 4, are 9, put nine under them, and so will your whole sum appeare thus: whereby you may perceive that those thrée summes being added together, doe make 988 l. And this is the art of Addition, according to his simplicity, when the sum of any place doth not excéede a diget number. But in case the Sum of any one place cannot bee expressed by one figure, but two, you shall put the first of those figures under the line, and kéepe the other in your minde, for to adde it unto the first figure

431
334
223
988

of

of the next place. And if the same next place cannot be avalued but by 2 figures, you must in like manner put the first of those figures under the line, and reserve the second for the other place next after, and thus must you doe from one place to another, untill you have come to the last place, where if it happen you do finde that the sum be of two figures, you must set them both downe, because it is the end of that worke, as in this example.

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 734682456
 450932345
  13467891
   4672123
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1203754815
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Where the first figures are, 3, 1, 5 6, which added together make 15, and for that that 1 5 is of two figures, I doe put ẏ first figure 5 under the line, and kéepe the second figure (which is 1) in my minde, the which I must adde with the next figures of the second place, that is to say, with 2, 9, 4 and 5, the which together make 21, I write 1 under the line for the second figure

gure of that addition, that is to say, after 5: and I kæpe 2 to be added vnto the third place, the which with the other figures, 1, 8, 3, and 4, do make 18, therefore I put 8 next after 1, in the third place vnder the line, & kæpe 1 to bee added vnto the figures of the fourth place, which is with 2, 7, 2, 2, the which with the 1 that I kæpe, doe make 14: I set downe 4 for the fourth figure (vnder the line) that is to say, behind 8: and I kæpe 1 to bee added vnto the figures of the fift place, the which is 7, 6, 3, and 8, with ỳ 1 that I kæpe, maketh 25: I put 5 in the fift place vnder the line next after 4: and I kæpe 2, in my minde to bee added with the figures of the first place that is with 6, 4, 9, and 6, and that 2 which I kæpe, maketh 27: I write down 7 under the line in ỳ first place, and I kæpe 2, which I adde with the figures in the seuenth place, and they make 13: I put downe 3 under the line in the seuenth place, and adde 1, vnto the figures in the eight place, & they are 10: I doe put 0 under ỳ line in the eight place, and then I adde 1 vnto the ninth place, that is to say, with 4 and 7, and they make 12: the 12 I write at length

vnder

vnder the line, because it is the end of this addition, and this is to be done of all such like. And for the easier vnderstanding of that which wee have spoken of addition, you may examine these two other examples following, in the which the first hath these numbers 3570, 2763, 579, & 28: which being added together, doe make this number 6940, and in the second example, doth result this number 51683, by adding together of these numbers 47630, 3756, 272, 25, as here vnder written.

The numbers to bee added.	3570	47630
	2763	3756
	579	272
The line put betweene.	28	25
The summe of this Addition.	6940	51683

Addition of L. s. d.

But if there any sums which are compoted of diuers kinds of denominations,

as 25 l. 17 s. 4. d. and 14 l. 13 s. 8. and 16 l. 19 s. 7 d. to bee added together. I muſt firſt ſet downe all the ſaid ſummes the one vnder the other, as heere you ſee: placing the title of pounds, right vnder the pounds, the ſhillings vnder the ſhillings, and the penies vnder the penies, keeping likewiſe the due order of their places, in each denomination: and then I begin at the leaſt denomination which are penies: and I ſay thus, 4 and 8 makes 12, and 7 make 19 d. that is 1 s & 7 d. I ſet downe 7 vnder the line againſt the place of penies, and I do kéepe in my minde 1 s. to be added vnto the place of ſhillings: this done, I proceéd to the ſayd place of ſhillings ſaying, 1 s. that I kéepe & 7 s. are 8. and 3 are 11. and 9 doe make 20: I put 0 vnder the line againſt 9. and do kéepe 2 in my minde: comming then vnto the tens of ſhillings, I ſay 2 that I kéepe, and 1 make 3, and 1 make 4, and 1 make 5; which are 5 tens of ſhillings, that is to ſay, 2 l. and 1 ten ouer, the which I put behinde the 0 towards my left hand vnder the tens of ſhillings,

l.	s.	d.
25.	17.	4.
14.	13.	8.
16.	19.	7.
57.	10.	7.

lings and I doe keepe two l. in my minde. then I come to the place of pounds, and say 2 l. that I keepe, and 5 are 7, and 4 are 11, and 6 doe make 17 l. I doe set 7 l. under ỹ line against 6, and do keepe 1 in my minde. then coming vnto the ten of pounds. I say 1 that I keepe, and 2, are 3, and 1 are 4, and 1 doe make 5: the which I write downe vnder the line behind the 7: and so is this addition ended: and then the said three sums being added together, doe amount to 57 l. 10s. 7d: and thus is to be done of all other sums of any other denominations.

Other Examples.

225. 12. 6.	5678. 13. 9.
47. 3. 9.	608. 00. 10.
38. 18. 7.	400. 17. 11.
5. 00 8.	56. 18. 8.
316. 15. 6.	9. 12. 7.
	6754. 03. 09.

Chap. 3.

Of Substraction in whole Number.

SUBSTRACTION, teacheth how you shall substract one lesser number from a greater: and sheweth what there doth remaine after that you shall have substracted the same: I speake not of the substracting of one equall number, from another equall unto it, for the facility thereof requireth no rule.

In Substraction are found three numbers: the one is the number from which the Substraction is made. The second is the number that is to be substracted; and the third is the number which remayneth after the substraction is ended. As when I would substract 25 from 40. The sayd 40 is the number from which the substraction is made, and 25 is the number to be substracted, and 15 is the number which remayneth after you have ended the substraction: here followeth the practise. You shall

ſhall put the leſſer number under the greater in ſuch ſort that every Figure of the one number, may anſwer unto every Figure of the other, orderly according to their places, and then draw a right line under thoſe two numbers as you did in Addition. Then muſt you begin at the right hand, and take the firſt Figure of the undermoſt number, and ſubſtract that from the firſt figure of the uppermoſt number over it, and that which remaineth you muſt ſet underneath the line, right under the figure which you have ſubſtracted: then afterward take likewiſe the ſecond figure of the nethermoſt number, and abate that alſo from the ſecond figure of the higher number: the third from the third, and ſo forth of all the reſt till you come to the end, putting alwayes the remnant of every figure under the line in his due order and place, as by example: I will ſubſtract 2345, from 9876, after that I have ſet them down according to the manner aforeſaid. Then beginning at the firſt place next to my right hand, I take firſt 5 from 6, and there reſteth 1: the which 1 I ſet under the line

2345
9876
2345
7531

right against 5. Secondly, I substract 4. from 7, and there resteth 3: the said 3 I set in the second place under the line next after 2. Thirdly, I substract 3 from 8 and there resteth 5. the which 5 I put under the line in the third place next after 3. Finally, I doe substract 2, from 9, and there resteth 7. the which 7 I put under the line in the fourth and last place next after 5. and thus is this Substraction ended, and there remaineth 7531.

But when two figures of one likenes doe chance to meet, so that the one must be substracted from the other as if I would substract 7 from 7 there would remaine nothing: then must I set a Cipher under the line. But when the figure which is to be substracted doth exceed the figure which is over him, so that it cannot be taken out of the same figure: then must you substract the under most figure from 10. and that which doth remaine you shall adde unto the same figure which is uppermost. And the summe which resulteth of them both, you shall set under the line. But wheresoever you do borrow any such 10 of the overnumber, you must adde 1 to the next nethermost figure following which is yet to be substracted. And there is nothing else

to be done in ſubtraction. Example, I will ſubtract 93576 from 4037479 after that I have placed my two numbers as I ought to do, I firſt ſubtract 6, from 9, and there reſteth 3, then I put the 3 under the line right under the 6. And ſecondly, I ſubtract 7 from 7, and there reſteth nothing: I do therefore put a cipher 0 under the line againſt 7 in the ſecond place. Then I come to the third place where I find 5 which I cannot ſubtract from the figure over him, which is but 4, therefore I doe ſubtract it from 10 as before I taught, and there reſteth 5, the which I doe adde with the 4, which is over him, and that maketh 9: I put 9 in the third place under the line for the third figure. Fourthly, for the 10 which I borrowed I adde 1 unto the next figure which is to be ſubtracted, which is 3, and they make 4: the ſaid 4 I doe ſubtract from the over figure 7, and there reſteth 3, I put 3 under the line for the fourth figure. And then I come to the fifth place where I doe find 9, which I cannot ſubtract from the figure over him, which is but 3, but I doe ſubtract 9 from 10, and there reſteth 1,

4037479.
93576.
3943903.

the which figure 1 I doe adde with 3, and they make 4: I put 4 under the line for the fifth figure. And here is to be noted that if it were not for that I did at ye last borrow 10, the substraction should have been ended. But for because that I must (for every such 10 that I borrow) alwaies adde 1 unto the nert lower figure following, I must therefore proceed unto the substraction: and for because that there is no other figure following in the lower number, it shall suffice to have kept the unity, & to substract it from ye nert over figure, but I finde there 0, and therefore I cannot substract 1 from 0, therefore I substract it from 10, and there resteth 9, which I doe put under the line in the first place: finally for the ten which I borrowed, I kéep 1 in minde; the which I doe abate from 4, and there remaineth 3, the which 3 I doe put under the line in the seventh place after 9, and the operation is thus ended.

Another Example.

576084025.
485675437.
90408589.

But if there were many numbers to

bée

be ſubſtracted from one number alone, then muſt you firſt adde theſe numbers together according to the inſtruction of the Chapter going before, and afterward to make your ſubſtraction as aboue is ſaid. As if I would ſubſtract theſe three ſummes 123,234,456, from 98925, firſt I doe adde the three ſums in one, & they are 813. The which I doe ſubſtract from 98925, and there reſteth 98112.

But if the ſums be compoſed of diuers kinds of denominations, then you muſt begin at the leaſt denomination next toward your right hand, and ſo ſubſtract euery denomination from his like, if it may be ſubſtracted: if it cannot be ſubſtracted, then you muſt borrow 1 of ỹ next denomination toward your left hand & return the ſame into the like denomination of that figure which is to be ſubſtracted, then ſhall you ſubſtract your firſt or leaſt denomination from the ſaid ſum ſo borrowed, and that figure or number that ſhall remain, you muſt adde with the uppermoſt number of the leaſt denomination, & ſet the aggregate vnder the line right againſt his like. Then the 1 which you did borrow muſt be added with

the next figure of the next denomination that is to be ſubſtracted, and ſo to proceed with the whole ſumme that is to be ſubſtracted. Example.

I would ſubſtract 15 li. 17 ſ. 11 d. from 28 li. 13 ſ. 9 d. I doe firſt put down the greater ſum, & under that the leſſer, with a line under them, as here you ſee, and then I doe begin at the leaſt denomination which are penies, where I ſay 11. penies from 9 penies, I cannot. And therefore I doe borrow 1 ſ. of the next denomination that is of the 13 ſ. the which 1 ſ. is in 12 penies: Then I ſubſtract 11 penies from 12 penies, and there remaineth 1 peny, the which 1 peny I do adde with 9 penies, and they make 10 penies: the ſaid 10 I ſet under the line, and doe keep the 12. in my minde that I borrowed, then come I to the ſecond denomination of ſhillings, where I doe find 17 ſ. then I ſay 1 ſ. that I borrowed and 17 do make 18 ſ. the ſaid 18 ſ. out of 13 ſ. cannot be, therefore I borrow 1 li. of the next denomination, that is to ſay, out of the 28 li, and the ſaid 1 li.

	li.	ſ.	d.
	28.	13.	9.
	15	17	11.
	12.	15.	10.

are

are 20 s. then I ſubſtract 18 s. from 20 s. there remaineth 2 s. with the which I do adde to the 13 s. and they do make 15. the ſame 15 s. I ſet under the line, and do keep 1 li. to be added to the lower place of poonds: then I ſay 1 li. that I kept, and 5 are 6: I ſubſtract 6 li. from 8 li. and there remaines 2. I ſet the ſaid 2 under the line againſt 5: and laſt of all, I come to the place of pounds where I doe finde one, then I doe ſubſtract that 1 from 2. and there remaineth one, which I ſet under the line, and ſo I finde there remaineth 12 li. 15 s. 10 d. and ſo is it to be done of all other like.

Chap. 4.

Of Multiplication.

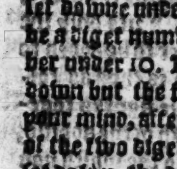
IN Multiplication there are iii. numbers to be noted, that is to ſay, the number which is to bee multiplied, the which we will call the Multiplicand: the ſecond is the number by the

which we do multiply which we will name the multiplier, or multiplicator: & the third number is that which cometh of the multiplication of the one by ỹ other, which is called the product. As when I wold know how much amounteth 10 multiplied by 9, viz. how much are ten times 9, I find that they are worth 90, then ten is the multiplicand, & 9 is the multiplier, & 90 is called ỹ product. So that to multiply is none other thing, but to find a nũber which containeth the multiplicand so many times, as the multiplier containeth unities: As 10 multiplied by 9 do make 90 as before is said. And 90 containeth 10 so many times, as 9 containeth unities, that is to say, 9 times. In Multiplication, it forceth not much which of the two numbers be ỹ multiplicand, nor which be the multiplier. For 10 multiplied by 9, maketh as many, as 9 multiplied by 10, yet nevertheless it shall be more commodious that the lesser number be alwaies the multiplier. And for that, that the multiplication of figures ỹ one by ỹ other, is the chiefe & necessariest kind whereby to know how to work in the multiplication of compound numbers, and that every man

hath

hath not ẏ same at their fingers end, I will therefore give you here certain easie wales of multiplication of diget numbers. When you would multiply two simple figures, or digets ẏ one by the other, substract each of those diget numbers from 10. Then multiply the two remains the one by the other, and if the sum do exceed 10, write only the first figure, and keep the other to be added to the next operation, which is thus as followeth: Adde your 2 simple figures together, & of that which resulteth of the additiō, take only the 1 figure, unto the which you must adde the unity which you did keep before. And that shall be the second figure of the sum which you doe seek, exam: I would multiply 7 by 6. I take 7 from 10, & there resteth 3: likewise I substract 6 from 10, and there resteth 4, thē I say thus 3 times 4 make 12: I write 2 for my first figure, & keep 1 in mind: then I adde 6 with 7, and they are 13: of the which I cast away the second figure toward my left hand which is 1: and I take only the first figure 3 which is toward my right hand, unto the which I adde the unity which I kept, & they make 4, which I write in the second place after 2, & thus I find 42 which is the value of 7, multiplied by 6.

Otherwise, and all commeth to one effect: set down your two diget numbers the one right over the other, and right against every of them towardes the right hand write his owne difference from 10. Then multiply the two differences together, the figure which commeth thereof, shall you set downe under both the differences, if it be a diget number, that is to say, any number under 10. But if there be 2 figures, set down but the first, and kep the other in your mind, afterwards subtract (from one of the two diget numbers) that were first set down, the difference of the other diget number, that is to say, crosse-wise, And unto the remainder the figure which you kept before: that shall be the second number, & thus shall you have your multiplication. Example of the same figures, that is to say, of 7 multiplied by 6,



the difference of 7 from 10. is 3: and the difference of 6 from 10, is 4: I set them downe crosse-wises as you se: And then I say three times foure are 12. I set downe 2, and kep 1 in my mind, then

then I subtract 4 from 7, or else this from 6, it forceth not, from which of them, and there resteth always 3: unto the which I adde the unitie which I kept in my minde, and they are 4, which shall be the second figure of the multiplication. And thus I finde that 7 multiplied by 6, maketh 42: as in the other operation. This practise hath no place where the 2 diget numbers (doe not exceed 10,) by adding them together, and then is multiplication easie enough without any rule.

Another way to know the multiplication of simple numbers, is by this table following: the use whereof is thus.

First, you shall understand that the numbers from 1, and so descending downwards to 9, which are set in the left part or hanging margine of this Table, do betoken the multipliers of all simple numbers. And the elements or figures being put highest in every square rome drawing toward your right hand, right against every of the multipliers, doe signifie the multiplicands, which doe appertain unto the multipliers of the hanging margine. And the lower or inferior numbers in every

ry square rome, do betoken the product of that multiplication, which is made in multiplying the upper number over it, with the figure in the hanging margine, answering directly unto the said square: as by example.

The

The Table of Multiplication by all the Diget Numbers.

1	1	2	3	4	5	6	7	8	9
	1	2	3	4	5	6	7	8	9
2	2	3	4	5	6	7	8	9	
	4	6	8	10	12	14	16	18	
3	3	4	5	6	7	8	9		
	9	12	15	18	21	24	27		
4	4	5	6	7	8	9			
	16	20	24	28	32	36			
5	5	6	7	8	9				
	25	30	35	40	45				
6	6	7	8	9					
	36	42	48	54					
7	7	8	9						
	49	56	63						
8	8	9							
	64	72							
9	9								
	81								

Now because I doth not multiply, I have set in the upper margin the figures from 1 to 9: both in the higher and also in the inferiour rows, for 1 in the hanging margine, multiplied by 1, the upper number in the first square bringeth but 1. So likewise 2 being the higher number in the second square of the upper margin, multiplied by 1 in the hanging margin bringeth 2 for the lower number in the second square of the upper margine: For 1 times 1 maketh but 1: and 1 times 2 maketh 2. Then 1 times 3 maketh 3, and 1 times 4 maketh 4. And so continuing toward the right hand, untill I come to the figure of 9 which is 1 times 9 maketh 9. Then afterwards I multiply 2 of the hanging margin by 2 which is the upper number of the square next toward the right hand, and that maketh 4 which is the product of 2 multiplyed by 2, that 4 I set under the 2, for 2 times 2 are 4: and 2 times 3 maketh 6; then 2 times 4 maketh 8, and 2 times 5 maketh 10, and so continuing unto 2 times 9, which maketh 18. The like is to be done with the third row, and so likewise of all the residue.

Example, I would know what is the pro-

product of 9 multiplied by 8. I look in the hanging margine the multiplier 8, and amongst the squares directly against 8 drawing toward the right hand, I look the multiplicand 9 in the higher row, and I finde the product right under 9, to be 72: Then 72 is the number which commeth of the multiplication of 9 by 8. And so is to be understanded of all the rest of the table; which table must be (of all men) learned by heart, or as they say, without booke: which being learned you shall the better attain to the rest of multiplication.

To come now unto the practise of multiplication; when you would multiply two numbers, the one by the other, you must set them down after the same manner as you did in addition, and in subtraction: that is to say, the first figure of the multiplier under the first figure of the multiplicand, the second under the second, and the third under the third, if there be so many, and then draw a right line under them, as in the other operations going before. After this, you shall multiply all the figures of the multiplicand by the multiplier, and set downe the figures (comming of any such mul-

multiplication) under the line, every one in their due order and place.

Example. I would multiply 123 by 3, that is to say, I would know how much 3 multiplied 3 times one hundreth twenty and three, the two numbers being placed in such order as is before said, you must begin towards the right hand: and say thus, 3 times 3 are 9: write down 9 under the line right against 3, for the first figure: secondly, by the same 3, you must multiply the second figure 2, and they doe make 6 and I doe put 6 after the 9, under the line: Thirdly, by the same 3 you shall multiply the last figure 1, and they are but 3, set downe 3 after 6 for the third and last figure. And thus is the work ended; whereby you shall finde that 123 being multiplied by 3 maketh 369.

123
3
369

But when it happeneth that of the multiplication of one figure by another, the sum which commeth thereof shall be of two figures, as it happeneth often, then shall you write downe the first figure, and keep the other figure to be added unto the multiplication of the next figure.

Ex-

Example, 6 men have gained (every one of them) 345 Crownes, I would know how many Crownes, they had in all. First, I multiply 6 by 5, they make 30. I write 0 under the line, and for 30 I doe keep 3 to be added to the next multiplication. Secondly, I say 6 times 4, are 24: unto the which I adde 3, which before I reserved: And they make 27: I write 7 in the second place under the line, & I keep 2 to be added to the next Multiplication: Thirdly, I say 6 times 3, are 18, unto the which I adde the 2 which I kept, and they make 20, the which I write all downe, for because that is the last worke. And so I find that 345, being multiplied by 6, doe make 2070. But when the multiplier is of many Figures, you must multiply all the whole multiplicand by every one of those figures, and write the products every one orderly under his owne figure.

345	
6	
2070	

Example, I would know how many daies are past from the Nativity of Iesus Christ untill the year 1560, full compleat. I must now multiply 1560 by 365 daies, because there are so many daies in one

whole yéer. The leap yéars being not reckoned, which have euery one of them 366 daies. Therefore first by the figure 5: I multiply all the higher figures, saying thus, fiue times 8 maketh 40: I write 0 vnder the line for the first figure, and because I kéep nothing for the next place, I proceed and say 5 times 6 are 30: I set 0 vnder the line for the second figure, and I kéep 3 to be added to the next multiplication: Thirdly, I say 5 times 5 are 25: the which with the 3 that I kéep are 28: I set downe 8 for the third figure, and kéep 2 to be added with the next multiplication: then comming vnto the fourth and last figure, I say 5 times 1 are 5: the which with the 2 that I reserued are 7: I put 7 for the last figure of the first worke by the figure 5, with the which figure I haue no more to do. And therefore I cancell the same 5 with a little stroke through it, to signifie that I haue finished with that figure. And forasmuch that in multiplication there is alwaies as many seuerall operations as the multiplier containeth figures, there resteth yet a worke to be made. I come therefore

1560	
365	
7800	

to

to the second worke which is the figure 6, by the which I must againe multiply all the figures of the multiplicand as I did by 5, and the first figure (which shall be produced) I doe put one ranke more lower then the figures of the work now last made by 5, not right under the first figure of the multiplier 5, but under 6: that is to say, one degrée or place néerer toward the left hand: and one ranke more lower than the first work: And I must put afterward every of the other figures which cometh of the same multiplication in their order: thirdly I doe make the multiplication by the third figure & that which shall come thereof I must set in his rank, as hereafter shall appeare. And now I néed make no further discourse hereof, because that he which can do the first multiplication by 5, may as easily doe all ẏ others. It shall therefore suffice to set here ũder the exãmples of all thez sũdry works.

	1560	1560
1560	65	356
5	7800	9360
7800	9360	7800
	101400	4680
		569400

Now, if you will know how much all the three workings thus placed, do amount unto, which in value must be but one number: you must adde all the numbers which are come of all the 3 multiplications together, but not after the same manner as we have done in the Chapter of Addition, the first figure of the first ranke with the first figure of the second rank and so of the third: but you must adde them in the same sort as you shall finde them scituated and placed: that is to say, the first figure of the first rank alone by it selfe: the second of the first ranke with the first of the second ranke. The third of the first ranke with the second figure of the second ranke, and with the first of the third ranke, and so of all the other as hereafter doth appear.

And thus the 1560	1560
yeares doe containe five	365
hundreth sixty and nine	7800
thousand foure hundreth	9360
dayes, not counting there-	4680
in the dayes of the leape	569400

yeers, which are here in number 390. so then the whole sum of the dayes should be 569790.

Another

Another Example.

34560
2456

207360
172800
138240
69120
84879360

The Summe of Multiplication is thus, when you would multiply any number by 10, you shall only put one cipher o before all the numbers, that is to say, a degree nearer to the right hand as 345 multiplied by 10, maketh 3460. If you will multiply any number by 100, adde to the same number two ciphers thus, 00, if by 1000, adde 000. And to be briefe, when the last figure of the multiplier is 1 & all the rest be ciphers, adde so many ciphers to your multicand, as there shall be found Ciphers in your multiplier. But if in your multiplying, ỳ last figure were not, but that there were onely certains Cyphers in the beginning: and that the other were signifying figures, and likewise those of the multiplicand, then shall you put those

Ciphers apart, and multiply the signifying figures of the other. Then adde unto the product of that multiplication, all the Ciphers which you did before put apart. As if I would multiply 46000 by 3500. I put apart the three Ciphers of the first, and the two Ciphers of the second numbers, which are in all 5 Ciphers 00000: And then I multiply 46 by 35, and thereof commeth 1610: Before that which toward the right hand, I adde the 00000 that I did put apart, and then the whole product will be 161000000.

46
35
230
138
161000000

OF

Chap. 5.

Of Division.

Division or partition is, to seek how many times one number doth contayne another, or else how often times one number may be found in another, for in the worke of Division there are required two numbers to be first known, for the finding out of the third. The first number knowne, is called the deuidend or number which is to be deuided, and that must be the greater number. The second number is called the diuisor, and that is the lesser. And the third number which you seeke, is called the quotient. As if I would deuide 36 by 9, the deuidend shall be 36, and the diuisor is 9. And for because that 9 is contained in 36 4 times, that is to say, 4 times 9 doe make 36, the quotient shall be 4. as if you marke well, how many times 9 is contained in 36, you shall find it 4 times: and therefore 4 shall be the quotient.

The Practise.

Write downe first the dividend in the higher number, and the diviſor vnderneath in such sort, that the first Figure of the diviſor toward the left hand, be vnder the first Figure of the dividend, and euery figure of the same diviſor vnder his like, that is to say, the first vnder the first, the second vnder the second, the third vnder the third, and so consequently of the other, if there be so many, which is contrary to the other three kindes before specified, but yet you must consider further if all the lower figures of the diviſor, may be taken out of the higer figures of the dividend by the order of subtraction or not. The which if you cannot do, then must you set the first figure of the diviſor (toward the left hand) vnder the second figure of the dividend, and so consequently the rest in their due order. if any be to be set downe, euery one of them vnder his like, as before is said. And then draw a line between the dividend and the diviſor. And at the end of them another crooked line, behinde the which toward the right hand shall be set your quotient. As by this example following, where

the diuisor is but of one figure.

If you would diuide 860 by 4, you must set downe 4 under the 8 with a line betwixt them, as here vnder you may see.

The Dividend. 860

The Diuisor. 4

And then you must seek how many times the diuisor 4 is contained in the higher number, that is to say, in 860, the dividend answering to him: as in this our example, I must seek how many times 4 is contained in 8, in the which I finde it 2 times, then I write downe 2 apart beyonde the crooked line as here you may see, which shall be the first figure of the quotient to come: secondly, by this figure 2 (being thus put apart) I must multiply the diuisor 4, and vnder the same multiplication, I must set that number which commeth of the same multiplication: as 2 times 4 doe make 8 ẏ which 8 I doe set vnder the diuisor 4. Thirdly, I doe subtract the product of the said multiplication (of the quotient by the diuisor) that is to say 8 from the higher number correspondent to ẏ same in saying 8 from 8, there remaineth nothing, & then I can-

860
4 (2
8

cancell or strike out that which is done as you see. In these three operations and works is comprehended the Art of Division. The which are to be observed from point to point, for there is no diversity in y finishing of the same, which is thus.

Now secondly, I must remove my divisor one place nerer toward my right hand, as in proceeding with our example. Here you see I remove my divisor 4 which was under 8, and I set it under 6, then I seek how many times 4 is contained in 6: where I find it but one time, then I set 1 behind the crooked line next unto the first figure of the quotient 2, a degree or place nerer my right hand, afterward by this last and new figure 1, I multiply the divisor 4 and that maketh but 4 (for an unity which is but 1, encreaseth nothing) I abate therefore 4 from the higher figure 6, and there resteth 2, the which 2 I set over the 6: and I cancell the 6, for so must I doe when there resteth any thing after I have made the substraction. Thirdly, for as much as there yet remaineth another figure in the dividend, I re-

2
8601(21
4

remode again the diuisor, and I set it vnder the cipher 0. Then I seek how many times 4 is in the higher number, which is 20, where I may finde it 5 times, I put therefore 5 behinde the crooked line for the third and last figure of the quotient. Then by the same 5, I multiply the diuisor 4, and that maketh 20, the which 20 I abate from the higher number and there resteth nothing. And so is the diuision ended: and thus I haue found that 860 being diuided by 4, bringeth for the quotient 215: that is to say, that 4 is contained in 860, two hundred and fiftene times. This is the most easiest working that is in diuision, but that which followeth appertaineth to the whole and perfect vnderstanding of the same. When the first figure of your diuisor toward your left hand is greater then the first of the dividend, you must not place the first figure of your diuisor right vnderneath the first of the dividend, but vnder the second figure of the same dividend, nearer to your right hand, as before is said. Therefore when the diuisor is of many figures, and that you

2
860 (215
4
46

you habe to ſéek how many times it is contained in the higher number, (for the more eaſier working) you muſt not ſéek to abate the diuiſor all at one time, but you muſt ſée and marke how many times the figure of the ſame toward the left hand is contained in the higher number anſwering to the ſaid number, and then to worke after the ſame manner as is before taught.

Example, I habe 316215 crownes to be diuided among 45 men, and for to make my diuiſion, I muſt not put the firſt figure of the diuiſor which is 4, under the firſt of the Dividend, which is three, becauſe that 4 is a greater number then 3. And further you know, that I cannot take 4 out of 3, wherefore I muſt ſet the 4 under the ſecond figure of the higher number, that is to ſay, under 1, and the figure 5 of the diuiſor, right under the 6, as here you may ſée.

So that I muſt firſt ſéek, how many times 45, is contained in 316, which is but

316215
45

apart of the Dividend. Wherefore for the more eaſie working I néed but to ſéek how many times 4 is contained in 31. And be-

because I may have it 7 times, I put 7 behind the crooked line, as is aforesaid: then by 7 I multiply all the divisor 45 and they are 315: the which I set under the same divisor the first figure under the first: and the other in order towards the left hand. Then I subtract 315, from the higher number 316: and of this first working there remaineth but 1, the which I set ober the 6, and I cancell likewise the 315, and the other figures 316, and also the divisor 45: and then it will stand thus as in the margent.

316	7
315	45
1	

And when I come to remove the divisor, and that I must seek how many times it is contained in the higher number, if I see that I cannot finde it there, that is to say, that if the higher number, be lesser then the divisor, as it is in this example, then must I put a Cipher in the quotient behinde the crooked line, and if there remaine any figures in the dividend which are not yet finished: I must remove the divisor againe nearer toward my right hand by one place, for to finde a new figure in the

the quotient. As in this one example, for after that I have removed the diuisor. I seek how many times 45, is contained in 12, and because I cannot have 45 in 12, I put a 0 behinde the crooked line after 7: then without multiplying or abating, I remove againe the diuisor neerer towards my right hand, and I seek how many times 4 (which is the first figure of the diuisor) is in the higher number, that is to say in 12, whereas I finde it 3 times: I put 3, behinde the crooked line, for the third figure of the quotient: then by the same figure 3, I multiply the diuisor 45, and thereof commeth 135. And in the number ouer it there is but 121, so that I cannot take it but of 121, which is the lesser number. And therefore here is to be noted, that if it happen, that the figure being last found which is put in the quotient, doe produce or bring forth a greater number (in multiplying all the diuisor by the same) than that which is ouer the said diuisor, you must then

1
3216215
45 (70

1 8
1
3216215
45 (703
135

then make the same figure of your quotient (which you doe put downe) lesser by 1, and after that you have cancelled the first multiplication, you must make a new. And the same must be done so oftentimes: as (in decreasing the same) it may produce a lesser number, or at the least a number, equall to that which is over it, as in the last worke, for because that the divisor being multiplied by 3, bringeth 135, which amounteth to more than 121, Therefore the same product must be cancelled, and the figure 3 which I did put in the quotient, must be also changed into a figure of 2, Then by the said 2, I must multiply the divisor 45, and thereof commeth 90, the which I abate from 121, and there remaineth 31. And then will the sum stand thus as followeth.

```
      ~~1~~3
  ------------------
  ~~3~~ ~~1~~ ~~6~~ ~~2~~ 1 5
      4 ~~5~~      2
    ~~1~~ ~~3~~ ~~5~~ (70~~3~~
      ~~9~~0
```

And héere is also to be noted, that the summe which remaineth must be alwaies lesser

lesser then the divisor. Then finally, I remove the divisor to the 2 next figures towards the right hand, and I séek how many times 4 is in 31, and for because I find it 7 times, I put 7 in the quotient, by which I multiply the divisor, and thereof cometh 315, the which I abate from the higher number of the Dividend, and there remaineth nothing as here you may sée.

```
   13
 31 6 2 1 5
       4 5        (7027
       3 1 5
```

But if it happen that after the division is ended, there doe remaine any thing in the dividend, as oftentimes there doth; I must also set them that remaine apart behinde the crooked line, after the entire quotient, and the divisor right under the same remaine, with a line betwéen them both. As in this division following, where there remaineth 3 in the last worke. And what the same doth signifie shall be taught unto you when I shall treat of fractions or broken numbers.

i.	ii.	
I I	I I	
467859	467859	(10
456 (1	456	

iii.	iiii.	
2	2	
xx73	xx733	:
467859	467859	$\frac{1}{xx6}$
456	456	(1026
22 (102	2736	

In ſumme, all the whole practike of diuiſion may bee kept in remembrance by three letters, that is to ſay: S, M, and A, which three lettets doe ſignifie, to ſeek, to multiply and to abate.

Firſt, I muſt ſeek how many times the diuiſor is contained in the higher number: then by the quotient which I finde) I muſt multiply the diuiſor: Finally, I muſt abate the product of that multiplication from the higher number correſpondent to the ſame, that is to ſay, out of the dividend, anſwering to the diuiſor.

And further, beſides this kinde of working in Diuiſion: the which is regular and commune; I will here put another man-

ner of working very easie; the which shall serve for such divisions as are more difficil to be wrought: that is to wit, when the number to be divided is very great, and the divisor great also, and it shall serve againe for to avoid errors in supputation, and for the placing of fewer figures in the quotient: and consequently it shall save much labour unto them which as yet have not much studied in this Art. The practile whereof is thus as followeth.

If you would divide 7894658, by 643. First, you shall understand, that although the figure of the divisor toward your left hand, may be found many times in the higher number, as 10 times, 12 times, or more: yet is it so, that you must never put but one figure only at a time in your quotient. And you shall at no time put any number in your quotient which exceedeth the figure of 9, that is to say, any number being greater then 9. And therefore for to come unto your practile, write downe your divisor one time, and behinde it towards your right hand, draw downe a line straight, and right against the same divisor behinde the line toward the right hand, put

this

this figure 1. Then double your said diuisor, and right against the same which you haue doubled, put behinde the line the figure of 2. This done, you shall adde vnto the same number that you doubled your said diuisor, and right against the same product behinde the line you shall put the figure of 3, and vnto this third product you must adde againe your diuisor, and right against the same product behinde the line, set the figure 4. And thus must you doe vntill you come to the figure of 9, in such sort, that euery of the products do surmount so much his former number, as all the diuisor doth amount vnto: placing at the right side of euery product behinde the line, the number which signifieth how much he is in order. That is to say, right against the fifth product, you must put 5, and right against the 6 product, you must put 6: and so likewise of all the other.

The Example followeth in the next page.

Example of the diuiſor propoſed, 643: Firſt of all I write downe 643, and right againſt the ſame behinde the line toward my right hand, I put 1: Secondly, I double 643, and they make 1286: and right againſt that ſum behinde the line, I put 2. Thirdly, unto that ſame 1286, I adde the diuiſor 643, and they are 1929, and right againſt the ſame I ſet 3. Fourthly, unto the ſaid 1929, I adde the diuiſor 643, and they make 2572: and right againſt the ſame, I put 4. And thus muſt you doe alwaies by encreaſing ſo much euery product, as the diuiſor doth amount unto, untill you haue ſo done nine times, as you ſée in this preſent table.

643	1
1286	2
1929	3
2572	4
3215	5
3858	6
4501	7
5144	8
5787	9

This being done you muſt ſet downe your diuiſor under the dividend 7894658, after the ſame manner as is before declared: that is to ſay, 643, under the 3, firſt figures of the dividend toward your right hand, namely under 789. Then muſt you ſéeke how many times 643, are contained in

in 789: And for to know the ſame, you muſt look in the aforeſaid table if you may there finde the ſame number 789, the which is not there. Therefore you muſt take a leſſer number, the nereſt to it in quantity that you can finde in the table, the which is 643, which number hath againſt it on the right hand of the line, this digit 1. Then take the ſaid 1, and put it behinde the crooked line, for the firſt figure of the quotient.

Then you muſt abate 643, from 789, and there will remaine 146, the ſame ſhall you put ouer the 789, and cancell the 789: and thus is the firſt worke ended. Then let forward the diuiſor one figure nerer to your right hand, and ſeeke a new quotient as you ſought this, where you finde the higher number ouer your diuiſor to be 1464. The which ſeek in the Table, & for becauſe you cannot finde it there, you muſt take a leſſer number the nereſt to it that you can finde, and that is 1286: which number hath againſt it this digit 2. Therefore you muſt put 2, for the ſecond figure of the quotient behinde the line, and then abate 1286, from the ſaid 1464, and

there will remaine 178. Thirdly, remove forward the divisor as you did before, and you shall finde the higher number over it to be 1786, so that the next lesser number to it in your table, is againe 1286, put therefore once againe 2. in the quotient for the third figure, and abate the said 1286, from 1786, so there will remaine 500.

Fourthly, set forward the divisor: and the higher number over it, is 5005, and the next lesser number to it in your table, is 4501, right against the which is 7, put 7 in the quotient for the fourth figure. And after that you have abated 4501, from 5005: there will remaine 504. Finally remove forward your divisor unto the last place, and you shall finde the higher number over it to be 5048. And the next lesser number to it in your table, is 4501. Therfore set 7 againe in the quotient for the fift and last figure. Then substract 4501. from 5048, and there will remaine 547: which must be put at the end of the whole quotient, with the divisor under it, and a line betwéen them, in this manner following.

(12277 $\frac{547}{643}$

The

The Summe of Division.

WHen you would divide any number by 10, you must take away the last figure next toward your right hand, and the rest shall be the quotient. Example: As if you would divide 46845, by 10: take away the 5, and then 4684 shall be the quottient, and the 5 shall be the number that doth remaine. Likewise when you would divide any number by 100, take away the two last figures towards your right hand, and if you would divide by 1000: take away three figures, if by 10000, take away foure figures. And so of all other, when the first figures of the diuisor toward the left hand shall be onely 1, and the rest of the same diuisor being but Ciphers.

Here follow the proofes of Addition, Subſtraction, Multiplication, and Diviſion.

The proofe of Addition.

When you would proue whether your Addition be well made, conſider the figures of the numbers which be added, euery one in his ſimple value, not hauing any regard to the place where he ſtandeth, but to reckon him as though he were alone by himſelfe, and then reckon them all, one after another, caſting away from them the number of 9, as oft as you may. And after your diſcourſe made, kép in minde the ſame figure, which remaineth after the nines be taken away: or elſe ſet the ſame in a bold place at the vpper end of a line. For if your addition be well made the like figure will remaine, after that you haue taken away all the nines out of the totall ſum of the ſame Addition, as oftentimes, as you may there find any: as in this Addition which héere you ſée there remaineth 2, for each part.

24567	2
5329	|
481	|
30377	2

The

The proofe of Subſtraction.

ADde the number which you doe ſubſtract, unto the number which remaineth after the Subſtraction is made, and if the totall ſumme of that addition be like unto the number, from the which the ſubſtraction was made, you have done well, otherwiſe not: as in this Example doth appear where you ſee the number which is to be ſubſtracted from 5463. is 3584, and the number which doth remaine is 1879 the which 2 ſums being added together doe make 5463, which is like to the higher number, out of the which the ſubſtraction was made, as before is ſaid.

5463	
3584	
1879	
5463	

The proof of Multiplication.

THe proofe of Multiplication is made by the helpe of diviſion. For if you divide the number produced of the multiplication, by the multiplier you ſhall find y higher number which is the multiplicand.

The proofe of Diviſion.

TO know if your diviſion be well made, you muſt multiply all the quotient by your diviſor, and if any thing doe re-

remaine after your division is made, the same you shall adde unto the product which commeth of the multiplication, and you shall finde the like number unto your dividend, if you have well divided: otherwise not.

Chap. 6.

Of Progression.

PRogression Arithmeticall, is a briefe and speedy assembling or adding together of divers figures or numbers, every one surmounting the other continually by equall difference, as 1,2,3,4,5, &c. Here the difference, from the first to the second, is but of 1, and so doe all the other, every one exceed his former figure by 1 still to the end. Likewise 2,4,6,8, &c. doe proceed by the difference of 2. Also 3,6,9,12, &c. doe every one differ from other by 3. And so may these numbers continue infinitely after this order, in adding unto the 3 number, the quantity wherein the 2 doth differ from the 1: Likewise adding the same difference unto the 4 number, also to the 5, and so unto all the other. as 1,4. the difference of the second to the first is three, adde 3 unto 4, and they are 7 for the third number.

ber. Then adde 3 unto 7, and they make 10 for the fourth number, & so of all other.

Then if you will adde quickly the number of any progression, you shall doe thus, first tell how many numbers there are, and write their sum downe by it selfe, as in this example, 2, 5, 8, 11 and 14, where the number of their places are 5 as you may see, therefore you must set downe 5 in a place alone as I have done here in the margent. Then shall you adde the first number and the last together, which in this example are 14 and 2, and they make 16, take halfe thereof which is 8, and multiply it by the 5 which I noted in the margent for the number of the places. And the summe which amounteth of that multiplycation, is the iust Summe of those figures added together. As in this example: 8 multiplied by 5 doe make 40: And that is the totall Summe of all the figures. Another example of parcells that are even, as thus, 1, 2, 3, 4, 5 and 6. So that in this example you must likewise note downe the number of the places, as before is taught, and then adde together the last number and the first. And the Summe which com-

5

meth

meth of that addition ſhall you multiply by halfe the number of the places which be fore are noted, and that which reſulteth of the ſame multiplication, is the whole ſum of all thoſe figures, as in this former example, where the number of the places is 6, I note the 6 apart, and then I adde 6 and 1 together: which are the laſt and firſt numbers, and they make 7, the which I multiply by 3 which is halfe the number of places, and they make 21, and ſo much amounteth all thoſe figures added together.

Queſtion done by Progreſſion Arithmeticall.

1 A Marchant hath ſold 100 Kerſies after this manner following, that is to ſay, the firſt péce for 1 s, the ſecond péce for 2 s, and ſo forth riſing 1 s, in every péce of Kerſey unto the hundreth péce. The queſtion is to know, how much he ſhall receive for the ſaid 100 péces of Kerſeis? Anſw. It behoveth you to know the addition of the 100 termes, in this progreſſion: And therefore you muſt adde

1 s,

1 s, which is the price of the firſt peece with 110 s, which is the price of the laſt peece, and thereof commeth 101, the ſame 101 you muſt multiply by halfe the number of places, that is to ſay, by 50, and thereof commeth 5050 s, which being diuided by 20 s, thereof will come 252 ℔. 10 s 0 d which is 2 ℔. 10 s. 6 d. a peece one with another. Thus the 100 Horſes are ſold by ỹ ſaid Marchant for 252 ℔ 10 s. 0 d, The practiſe followeth.

100	℔ 1	
1		
101	5050	(252 ℔. 10 s.
50	2220	
5050		

Queſtions of Progreſſion.

2 I Would lay 100 ſtones or other things in a right line, and euery of the ſaid ſtones to be a juſt pace one from another: and one pace from off the firſt ſtone, there ſtandeth a basket. I demand how many paces a man ſhall goe in gathering up the ſaid ſtones, and bearing them unto the basket, the 1 ſtone after the other? Anſw.

Firſt,

First, when he fetcheth the first stone and putteth it into the Basket, he maketh 2 paces, for the second 4 paces, for the third 6 paces, for the 4. &c. and so forth unto the last stone: wherefore the last terme shall be 200, unto the which you must adde the 1 terme which is 2, and they make 202, whereof the halfe is 101, the which you shall multiply by 100, which is the number of the termes in your progression; or else multiply 202 by 50, which is halfe the number of paces, and thereof will come 10100 paces, and so many paces shall he goe in all.

Questions of Progression Arithmeticall.

3 THere is a messenger which goeth every day 8 miles: another man followeth him incontinently, and he goeth the first day 1 mile, the second day 2 miles, the third day 3 miles, and so increasing his journey, every day one mile by naturall progression. The question is to know in how many daies the second man shall have overtaken the first? Answer, You must

muſt conſider that 8 is the middle of theſe as well of the termes, as of the number of the dayes: And therefore double 8, and thereof commeth 16; ſubſtract 1, and there will remaine 15: and in ſo many dates ſhall he have overtaken the firſt meſſenger. The proofe thereof is very eaſie. If the ſecond had gone the firſt day 2 miles, the ſecond 4 miles, the third day 6 miles, and ſo increaſing every day his journey by 2, in how many dates ſhould he have overtaken the firſt man; for to doe this you muſt perceive that 8 is the middle and fourth terme. Therefore double 4 and they make 8, from the which ſubſtract 1, and there remaineth 7, and in ſo many dates he ſhould have overtaken him.

Queſtions of Progreſſion Arithmeticall.

4 THere is one man departeth from London to Cheſter, and ſo to Carnarvan, the diſtance being about 200 miles: he goeth the 1 day 1 mile, the ſecond day 2 miles, the third day 3; and ſo orderly by naturall Progreſſion. Another man departeth at the ſame inſtant from Carnarvan

narvan to London, and goeth the firſt day 2 miles, the ſecond day 4 miles, the third day 6 miles; and ſo encreaſing every day 2 miles. The Queſtion is, to know in how many daies they two perſons ſhall meet together? Anſwer. Firſt you muſt conſider, that he which goeth by Progreſſion naturall, maketh but halfe the way the other doth, ſo that he ſhall have made but the one 3 part of the way at their meeting together. Take therefore the $\frac{1}{3}$ part of 200, & you ſhall have $66\frac{2}{3}$. Then you muſt ſeek 2 numbers, whereof the greater of them, may be double unto the other leſſe 1: and that the 1 of them being multiplied by the other, the product of them may bee $66\frac{2}{3}$, or little more, ſo that the more do not exceed the value of the greater terme as heere in this queſtion, the 2 neereſt numbers are 12, and $6\frac{1}{11}$, which multiplied the one by the other, doe make 78, which is $11\frac{1}{3}$ more then is $66\frac{2}{3}$. wherefore that day when they ſhould meet together, the firſt had gone but $\frac{3}{4}$ of a mile of his journey, which was upon the 12 day: then if you will know what part of the day that they did meet, you muſt divide $\frac{3}{4}$ by 12, and you

ſhall

ſhall find $\frac{1}{11}$ of a day. Therefore in 11 dates and $\frac{1}{11}$ part of a day, that is upon the 12 day, they ſhall meet together.

5 IF a man doe owe unto me 1000 Crowns, to be paid in 20 dates or terms by Arithmeticall progreſſion: The queſtion is, to know with what number he ſhall begin & continue his progreſſion? Anſw. To do this you muſt adde 1 unto 20, and they make 21, the which you ſhall multiply by 10, which is the halfe number of the places, and thereof commeth 210, and therefore divide 1000 by 210, and thereof will come $4\frac{40}{210}$, the paiment of the firſt day, and by this number doth the ſaid progreſſion encreaſe in this laſt following: $4\frac{40}{210}$ 9 $\frac{21}{21}$ 14 $\frac{20}{21}$ 19 $\frac{1}{21}$ &c. And ſo of all others.

A man oweth me 400 lt. to be paid in 10 yeares by progreſſion Arithmeticall, that is to ſay, 40 lt. at the end of the firſt yeare, and every yeare following 40 lt. to the end of 10 yeares: he offereth to pay me the ſaid 400 lt. all at one payment. The queſtion is to know, at what time he ought to pay me the ſame at one paiment, that

be not interessed in the time ? Answ. adde 1 unto the number of the terms which are 10, and they make 11, whereof you must take the halfe, that is to say, $5\frac{1}{2}$. Therefore he must pay me at 5 yeare and $\frac{1}{2}$ the said 400 li. all at one time; for that which he payeth before, is equall to that which remaineth unpaied. This rule hath place only when the payments are equall. But if it happen, that the last payment be lesser than the others you must in this case, put the last payment ober one of the others, for to make thereof a fraction: the which must be added unto the number of the termes, and the halfe of the said sum being taken, shall shew the time that the said payment ought to be paid at once. As if the said party did owe me but 380 pounds, to be paid ebery yeare 40 li. it is certaine that he must habe 10 yeares to end the payments. And it is true that upon the 10 day there shou ld remaine but 20 li. to be paid. And therefore put 20 ober 40 in this sort $\frac{20}{40}$ and that maketh $\frac{1}{2}$, the which you shall ad unto the number of termes, and you shall habe $10\frac{1}{2}$, whereof the halfe which is $5\frac{1}{4}$, doth shew that he must pay the said 380 li. at 5

yeers

yeares $\frac{1}{2}$, all at one payment, and so of all such like.

Progression Geometricall is when the second number containeth the first in any proportion as 2, 3, 4 times, and so forth. And in like proportion shall the third number containe the second, and the fourth number containe the third, and the fifth the fourth, As 2, 4, 8, 16, 32, 64: here the proportion is double.

Likewise, 3, 9, 27, 81, and 243, are in triple proportion.

And 2, 8, 32, 128, and 512, are in proportion quadruple.

That is to say, in the first example, where the proportion is double, every number containeth the other 2 times, as 4 containeth 2, two times: 8 containeth 4 two times &c. In the second example of triple proportion, the numbers exceed each other three times. And in the third example, the numbers exceed each other foure times, and thus you see that Progression Arithmeticall differeth from Progression Geometricall, for that in Progression Arithmeticall the excesse is only in quantity, but in Progression Geometricall the excesse is in proportion.

Now if you will eaſily finde the Sum of any ſuch numbers, you ſhall doe thus, conſider by what number they be multiplied, whether they be multiplied by 2, 3, 4, 5, or by any other: & by ỹ ſame number, you muſt multiply ỹ laſt ſum in the progreſſion. And from the product of the ſame multiplication, you ſhall abate the 1 number of that progreſſion: and that which remaineth of the ſaid multiplication, you ſhall divide by 1 leſſe then was the number by the which you did multiply, and the quotient ſhall ſhew you the ſum of all the numbers in any progreſſion. As in this example, 5 15, 45, 135, and 405: which are in triple proportion. Now multiply 405, which is the laſt number by 3 becauſe they are in triple proportion, and they are 1215. from the which you ſhall abate the 1 number of the progreſſion, which is 5, and there remaineth 1210: the which you ſhall divide by a number leſſe by 1 then that which was by ỹ which you did multiply, that is to ſay, by 2; and you ſhall finde in the quotient 605: which is the totall ſum of the numbers of that Progreſſion. Likewiſe 4 16, 64, 256, and 1024, which are ỹ proportion quadru-

ple:

ple: therefore you shall multiply 1024, by 4, and there will come 4096, from which abate the 1 number 4, & there will remaine 4092. The which you must divide by 3, & you shall finde in your quotient 1364: which is the totall sum of that progression, and this shall be sufficient for Progression.

A Question of Progression Geometricall.

A Marchant hath sold 15 yardes of Satten, the first yard for 1 s, the second 2 s, the third 4 s, the fourth 8 s, and so increasing by double progression Geometricall. The question is to know how much the said Marchant shall receive for the said 15 yards of Satten? Answ. First it is needfull to know, how much the whole numbers of the said progression do amount unto together. And for to do it, you must finde the last terme therefore you must let down the said Progression unto 15 terme, which is 128: the which you shall multiply by it self, and thereof commeth the fifteenth terme, that is to say, 16384. the same shall you multiply by 2, for because the Progression is double. And thereof will

come 32768 from the which you must subtract the first terme which is 1. And the rest being 32767. is the full summe of the 15 termes: and consequently the 15 yards of Satten shall be worth 32767 shillings, the which are 1638 li. 7 s.

Chap. 7.

Of the Rule of Three, called the Golden rule: or the rule of foure Proportionalls.

The Rule of Three, is the chiefest, most profitable, and worthiest excellent Rule of all the Rules of Arithmetick. For all other rules have need of it, and it passeth all other, for the which cause it is said, that the Philosophers did name it the Golden Rule. And after divers opinion and judgement it is called the Rule of Proportion of 4 numbers. But now in these latter dayes, by most is called, The Rule of Three, because it requireth three numbers in his operation. Of the which three numbers, the 2 first are set in a certaine proportion, and in like proportion as they be ordained, this Rule lerveth to finde out

out unto the 3 number, the 4 number to him proportioned, in such sort as the 2 is proportioned unto the first. Not for that, that the foure numbers, nor yet the three, are to be proportionall, or set in one proportion, but such proportion, as is from the first to the second, ought to be from the third unto the fourth, that is to say, if the 2 number doe containe the 1 two times or more, so many times shall the fourth number containe the third. And note well that the first number and the third, in every rule of three ought and must be always of like denomination, and of one condition and nature. And the second number, and the 4, must likewise be of one semblance and likenesse, and are dissemblant, and contrary to the other 2 numbers: that is to say, to the first, and the third. And if you do multiply the first number by the fourth, and the second number by the 3, the products of your two multiplications will be equall. Likewise if you divide the one semblant by the other, that is to say, the third number by the first, and likewise the one dissemblant by the other, that is to say, the 4 number by the second, (which are dissem-

blant to the other two numbers) your two quotients will also be equall.

The stile and manner of this rule is thus, you must set downe your three numbers in a certaine order, as by example following shall appeare. And then you shall multiply the third number by the second, and the product or number that commeth of the same multiplication, you must divide by the first number: or otherwise divide y first number by the second, and the quotient thereof shall be your dividor unto the third number, that is to say, the third number shall be divided by the quotient of the foresaid division, that is by the quotient of the first number divided by the second. Or otherwise, divide by second number by the 1, and that number which commeth into your quotient you shall multiply by the third number. And thus shall you have the fourth number which you seeke for. And thus is your fourth number in such proportion unto the third, as your second number is unto the first.

Example.

IF 8 be worth 12, what are 24 worth, after the rate or else if 8 require 12

for

for his proportionall, what will 14 demand? The which three numbers may conveniently be set in such order as hereafter doth appear. If 8 make 12, what will 14 make? you must multiply the third number 14, by the second which is 12, and thereof commeth 168 for the whole product of this multiplication: the which (as the rule teacheth) you must divide by the first number, that is to say by 8, and thereof cometh 21. And so much are the 14 worth. This is the way which is most used.

			14
			12
8.	12	14.	28
			14
168	21.		168
88			

Otherwise divide 8 by 12, which you cannot doe, for they are $\frac{8}{12}$, wherefore abbrevy $\frac{8}{12}$, and they are $\frac{2}{3}$ for your quotient, then divide the third number 14, by the said $\frac{2}{3}$, multiplying 14 by 3, which maketh 42, divide 42 by 2, and you shall have 21, as before. Or else divide the second number 12 by the first number 8, and thereof com-

2	
4	
8	
12	
6	
3	

commeth $1\frac{5}{7}$, the which $1\frac{5}{7}$ you shall multiply by the third number 14, and thereof will come 21, as is above said; and thus must you doe of all other: and although that the numbers of this rule may be found in three differences, for sometimes they are whole numbers and broken together, sometimes broken number, and broken together, and sometimes all whole numbers: if they be whole numbers, you must doe none otherwise then you did in the last example. But in case they be broken numbers, or broken and whole numbers together, the manner and way to doe them, requireth a certaine variation and difficulty, according to the variety of the numbers that shall be proposed: the which operation easily to doe, and unvariable, this Rule teacheth.

The three numbers being set down according unto the order of the whole numbers aforesaid, without any broken number, let 1 be put alwayes underneath every whole number, with a line betweene them fraction-wise, as thus $\frac{1}{}$, and that 1 is denominator to every such whole number. But when you have whole number and broken

broken together, they must be reduced, and added with their broken number, and if there be broken number without any whole number, the same broken must remaine in their estate.

The Rule of Three in Fractions.

This being done, you shall multiply the denominator of the first number, by the numerator of the second, and multiply the product thereof again by the numerator of the third number: And so shall you have the dividend or number which must be divided, then multiply the numerator of the first number, by the denominator of the second, and multiply againe the product thereof, by the denominator of the third number, and that which commeth of the multiplication shall be your divisor. Then divide the number which is to be divided by the divisor, and you shall finde the fourth number that you seek. Of the which manner and fashions, of the rule of 3 are divers kinds, whereof the first is of 3 whole numbers, as was the last example, and here followeth the second.

If 15 pounds do buy me 2 clothes, how many clothes will 300 pounds buy me of

the

the same price that the 2 cloaths did cost, set downe your three numbers thus.

The example followeth.

Lib.	*Clothes.*	*Lib.*	
15	2	300	8
		2	600
		600	155 (40
			1

And then as you see, you must multiply the 3 number which is 300 li. by 2, which is the second number, and thereof commeth 600, the which 600 you must divide by the first number 15 and you shall finde in your quotient 40, which is 40 clothes, and so many clothes shall you buy for 300 li. as appeareth by practise here above written. And here you must marke that the first number and the third in this question be of one denomination, as before I have declared, and likewise the 2 and the fourth numbers which you have found, are of one semblance and likenesse, but in case that the first number and the third in any question be not of like denomination, you must (in working) bring them into one denomination or nature, as in this example following.

lowing. If 12 Nobles doe gaine me 6 French crownes, how many French crownes will 48 pounds gaine me? Here you see that the denomination of the first number, is Nobles, and the denomination of the third is pounds: wherefore before you doe proceed to worke by the rule of 3, you first turne the pounds into Nobles, in multiplying 48 pound by 3, and they make 144 nobles, for there is in every pound of money 3 nobles: or otherwise if you will, you may bring the first number being 12 nobles into pounds by dividing them by 3, and so shall your first and third numbers be brought into one denomination: then shall you set downe your 3 numbers in order thus.

If 12 nobles doe gaine me 6 French crownes, what shall 144 nobles gaine? the which 144 are the nobles which are in 48 li. Then multiply the third number 144 by the second number 6, and thereof commeth 864, the which you must divide by 12 nobles, and thereof commeth 72 French Crownes.

And so many French Crowns will the 144 nobles gaine me.

Nobles

Nobles.	Crownes.	Nobles.
12.	6.	144.
144	xxx	Nobles.
6	864	(72
864	xxx	
	x	

There is yet a more exact way whereby to worke in ye rule of three, which is thus: You must marke if the third and first numbers in the rule of three, may both be diuided by one like diuisor: the which after you haue diuided them, you shall write downe each of the quotients orderly in the said rule of 3, euery one of them in his owne place, as though those were 2 of the numbers of your question, and not changing the middle number, that is to say the second. As thus, if 50 crownes doe buy me 44 yards of cloath, how many yards shall I haue for a 120 crownes? Heer you may se that the third and the first numbers, may be diuided by 10, which in the 3 number is found 12 times, and in the first 5 times. Wherefore you shall put 12 for the 3 number in the rule of three instead of 120: and 5 for the first number instead

of

at 50, and let 44 remaine still in the middst for the second number after this sort as followeth, and then worke by the rule as before.

Crownes.	Yardes.	Crownes.
5.	44.	12.
	12.	
	88	3
	44	528 (105 2/5
	528	559

You must multiply 44 by 12, and thereof commeth 528: divide the same 528 by 5, and you shall find in your quotient 105. 2/5, and even so many yards should you have found if you had wrought the rule of 3 by the first numbers proposed. There is yet certain other varieties in working by the rule of 3, but for that they require the knowledge of fractions, and because they are not so easie as this first way, which is common, therefore content your selves with this same, untill you have learned the fractions, the which by Gods helpe I intend to set forth in the second part of this book, incontinently after that I have first taught you the backer rule of three.

Of

Of the backer rule of Three.

The backer rule of three is so called, because it requireth a contrary working to that, which the rule of three direct doth teach, whereof I have now treated. For in the direct Rule of three, the greater the third number is, so much the greater will the fourth be. But here in this backer rule it is contrariwise, for the greater the 3 number is, so much lesser will the fourth be. Then whereas in the rule of three direct, the third number is multiplied by the second, and the product thereof divided by the first: here you must multiply the second number by the first, and divide the product of the same by the third, and the number which commeth in the quotient, answereth to the question. For such practise commeth oftentimes in use: In such sort that if you should worke the same by the rule of three direct, and not to have a regard unto the Proportion of the question, you should then commit an evident and open error.

Example.

If 15 shillings worth of Wine will serve for the ordinary of 46 men when the

Munne

Tunne of Wine is worth 12 pounds? for how many men will the same 15 shillings worth of Wine suffice, when the Tun of Wine is worth but 8 pounds? It is certaine, that the lower the price is that the Tun of Wine doth cost, so many more persons will the said 15 shillings in wine suffice. Therefore set downe your numbers thus: If 12 pounds suffice 46 men, how many men will 8 pounds suffice? you must multiply 46 by 12, and thereof commeth 552, the which you shall divide by 8, and thereof commeth 69, and unto 69 men, will the said 15 shillings worth in wine suffice, when the Tun of Wine is worth but 8 pounds, as hereafter doth appeare by practise.

Lib.	*Men.*	*Lib.*	
12	46	8	
	12	7	
	92	552	(69
	46	88	
	552		

2. Likewise a messenger maketh a journey in 24 dates, when the day is but 12 houres long: In how many dates shall he

he make the same journey, when the day is 16 houres in length? Here you may perceive that the more houres there are in a day, the fewer dates the messenger will be in going his journey. Therefore write downe your numbers thus, as here you may see.

Howres.	*Dayes.*	*Howres.*	
12	24	16	4
	12		x2
	48		288
	24		x16 (18
	288		x

And then multiply 24 dates by 12 houres, and thereof commeth 288: divide the same 288, by the third number 16, and you shall finde 18, the which is 18 dayes, and in so many dayes will the messenger make his journey, when the day is 16 houres long.

Likewise when the Bushell of wheat doth cost 3 shillings, the peny loafe of brend weigheth 4 lb.

I demand what the same peny loaf shall weigh

weigh when the bushell of wheat is worth but 2 shillings? Here is to be considered, that the better cheape that the wheat is, the heavier shall the peny loafe weigh, and therefore write downe your 3 numbers thus:

Shil.	Lib.	Shil.	
3.	4.	2.	
	3.		x & Lib.
	12.		& (6.

When multiply 4 lib. which is the second number, by the first number 3, and they make 12, the which 12 you shall divide by the third number 2, and thereof commeth 6 lb. and so much must the peny loafe of bread weigh, when the bushell of wheat is worth but 2 s. as may appeare. And now according to my former promise, shall follow the second part of Arithmeticke, which teacheth the working by Fractions.

Here endeth the first part of Arithmeticke.

The second part of Arithmetick which treateth of Fractions or broken Numbers.

Chap. 1.

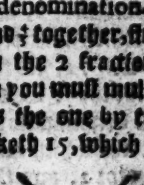
Of Fractions or broken numbers and the difference thereof.

A Fraction or a broken number, is as much as a part, or many parts of 1, whereof there are two numbers with a line betwixt them both, that is to say, the one which is above the line, is called the numerator, the other underneath the line, is called the denominator, as by example, 3 quarters is called a fraction, which must be set downe thus, $\frac{3}{4}$, whereof 3 which is the higher number above the line is called the numerator and 4 which is under the line, is called the denominator. And it is alwaies convenient that the numerator be lesse in number than the denominator. For if the numerator, and the denominator

the other, and so you shall have a new denominator common to all the fractions, the which denominator you must divide by the particular denominators of every of the said fractions, and multiply every quotient by his owne numerator, and so you shall have new Numerators, for the numbers which you would reduce, as appeareth by this example following.

Reduction in common denomination.

1 IF you will reduce $\frac{2}{3}$ and $\frac{4}{5}$ together, first make a crosse between the 2 fractions as here you see, and then you must multiply the two denominators the one by the other, as thus, 3 by 5 maketh 15, which is your common denominator: set that under the crosse, then divide 15 by the denominator 3, and you shall have 5, which multiply by the numerator 2, and you shall finde 10, set that ober the $\frac{2}{3}$, and they are $\frac{10}{15}$, for the $\frac{2}{3}$. Afterwards divide 15 by the denominator 5, and thereof commeth 3, the which multiply by the numerator 4, and you shall



finde 12, which set ouer the head of the $\frac{1}{2}$, & they make $\frac{12}{12}$ for the $\frac{1}{2}$: as appeareth more plainer aboue in the margent.

2 If you will reduce $\frac{1}{2}\frac{2}{3}\frac{3}{4}\frac{5}{6}$, together, you must multiply all the denominators the one by the other, that is to say, 2 by 3 maketh 6: then 6 by 4 amounteth to 24. Last of all, 24 by 6, and thereof commeth 144, for the common denominator. Then for the first fraction which is $\frac{1}{2}$ divide 144 by the denominator 2, and thereof commeth 72, the which multiply by the numerator 1, & it is still 72, set that ouer the $\frac{1}{2}$ and that is $\frac{72}{144}$ for the $\frac{1}{2}$: Then divide 144 by the second denominator 3, and thereof commeth 48, the which multiply by the second numerator 2, and they are 96, which set ouer the $\frac{2}{3}$, and they make $\frac{96}{144}$ for the $\frac{2}{3}$: Then divide 144 by the third denominator 4, & thereof commeth 36, the which multiply by the third numerator 3, and they make 108 which set ouer the $\frac{3}{4}$ and they are $\frac{108}{144}$, for the $\frac{3}{4}$.

Finally divide 144 by the last denominator 6, and thereof commeth 24: the which multiply by the last numerator 5, & thereof commeth 120, which set ouer the $\frac{5}{6}$ and they

minator be equall numbers, then shall they represent a whole number thus, as $\frac{1}{1}\frac{2}{2}\frac{3}{3}$ which are whole numbers, by reason that the numerators of these, and all such like, may be divided by their denominators, & the quotients will alwaies be but 1. But in case that the numerator of any fraction doe exceed his denominator, then it is more then one whole: as $\frac{12}{10}$ is more than a whole number by $\frac{11}{10}$. And this is properly called an improper fraction: other definition doth not hereunto appertaine. Furthermore it is to be understood, that when the numerator is just the halfe of the denominator, then the same broken number is the just halfe of one whole, as $\frac{6}{12}\frac{7}{14}\frac{8}{16}\frac{9}{18}$ and the other like are the halfes of one whole number whether it be of money, of measure, of weight, or any other thing: whereof doth grow and come forth 2 progressions natturall: the one progreding by augmenting or increasing, as these:

$\frac{1}{2}\frac{2}{3}\frac{3}{4}\frac{4}{5}\frac{5}{6}\frac{6}{7}\frac{7}{8}\frac{8}{9}\frac{9}{10}$ &c.

And they doe proceed infinitely, and will never reach to make a whole number, thus $\frac{1}{1}$. And the other progression, doth progredy by diminishing or decreasing as thus:

$\frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \frac{1}{81}, \frac{1}{243}, \frac{1}{729}$ &c.

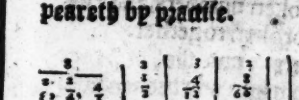
And these doe proceed infinitely, and shall never come to make a 0. which signifieth nothing, but shall ever retaine some certaine value of an unity, whereby it doth appeare that fractions or broken numbers are infinite.

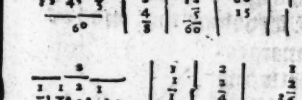
Chap. 2.

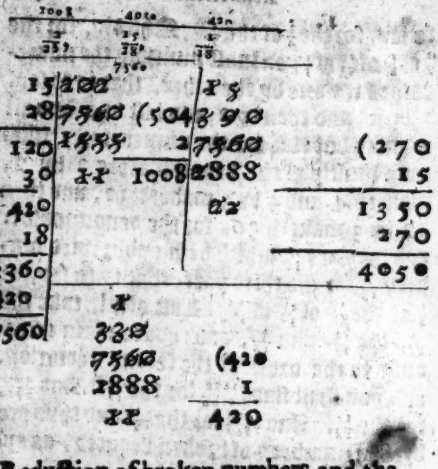
Of the reducing or bringing together of 2 Fractions, or many of divers denominations, unto fractions of one like denomination.

REduction, is as much as to reduce and bring together, or to put 2 or many numbers, being of divers denominations the one from the other, into Fractions of one denomination, in reducing them unto a common denominator, and the reason hereof is, For because the diversity and difference of the broken numbers do come of the denominators part, or of divers denominators, and for the understanding hereof, there is a generall rule whose operation or working is thus: Multiply the denominators of the fractions, the one by

to say, for the $\frac{1}{4}$ of the $\frac{5}{7}$. Thirdly, for the $\frac{1}{2}$ of $\frac{1}{3}$ of $\frac{2}{3}$, of $\frac{1}{3}$ you must multiply the numerators the one by the other, that is to say, 1 by 1, and then by 2, and last by 1, and all maketh but two for the numerator: likewise multiply the denominators 2 by 2, maketh 4 and 4 by 3 maketh 12, and then 12 by 3 maketh 36, for the denominator: and they are $\frac{2}{36}$, which being abbredied maketh $\frac{1}{18}$, for the third part; that is to say, for $\frac{1}{2}$ of the $\frac{1}{3}$, of $\frac{2}{3}$, of $\frac{1}{3}$. Last of all, take the $\frac{2}{11}$, the $\frac{15}{28}$, and $\frac{1}{18}$, and reduce them according to the order of the second reduction, and you shall finde $\frac{1008}{11660}$ for the $\frac{2}{11}$. And $\frac{420}{7160}$ for the $\frac{15}{28}$. And $\frac{420}{71660}$ for the $\frac{1}{18}$: and thus are broken numbers of broken reduced, as appeareth by practise.







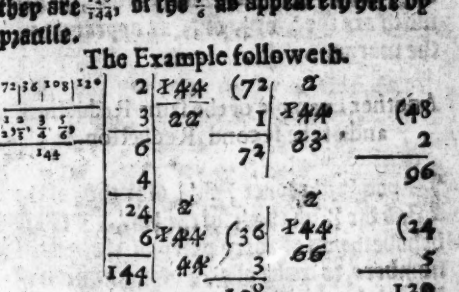
Reduction of broken numbers, and the parts of broken together.

IF you will reduce $\frac{1}{3}$, and the $\frac{1}{2}$ of $\frac{1}{3}$, together, to bring them into one broken number, you must first set downe the $\frac{1}{3}$ and $\frac{1}{2}$ as appeareth in the margent with a crosse betweene them, and then multiply the two denominators, the one by the other, that is to say, 2 by 3 maketh 6,

set

they are $\frac{72}{144}$, of the $\frac{5}{6}$ as appeareth here by practise.

The Example followeth.



Reduction, of broken numbers of broken.

IF you will reduce the broken of broken together, as thus, the $\frac{3}{4}$ of $\frac{1}{2}$, of $\frac{4}{5}$, you must multiply all the numerators, the one by the other to make one broken number of the three broken numbers: that is to say, 2 by 1, maketh 2: and then 2 by 4, maketh 8, which 8 is your numerator. Then multiply the Denominators the one by the other, that is to say, 3 by 4, maketh 12, and then 12 by 5, maketh 60, for your denominator, set 8 ober 60, with a line between them, and they be

8
2, 1, 4,
3 4 5
60

be $\frac{8}{80}$ which being abbrevied are $\frac{2}{15}$, and so much are the $\frac{2}{3}$, of $\frac{1}{4}$, of $\frac{4}{5}$, as appeareth in the margent.

Another example of the same Reduction, and of the second Reduction.

If you will reduce $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$, the $\frac{3}{4}$ of $\frac{5}{7}$: And the $\frac{1}{2}$, of the $\frac{1}{2}$, of the $\frac{2}{3}$ of $\frac{1}{3}$. First it behoveth you of every party of the broken numbers, to make of each of them one broken, as by the third Reduction is taught: that is to say, in multiplying the numerators by numerators, and denominators by denominators: First, for the first part which is $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$, you must as is before said multiply 2 by 1, and then by 4, and you shall have 8 for the numerator: likewise multiply 3 by 4, and the product by 5, and you shall have 69 for the denominator: so they make $\frac{8}{60}$ which being abbrevied are $\frac{2}{15}$, for the first part, that is to say, for the $\frac{2}{3}$ of $\frac{1}{4}$ of $\frac{4}{5}$: secondly for the $\frac{3}{4}$ of $\frac{5}{7}$, multiply likewise the numerator 3 by 5, maketh 15 for the numerator. And multiply 4 by 7, maketh 28, for the denominator. And then they be $\frac{15}{28}$ for the second part: that is

to

set that under the crosse, then multiply the first numerator 1, by the last denominator 2, and that maketh 2, unto the which adde the last denominator 1, and they bee 3, which set above the crosse, so shall you find the $\frac{1}{3}$ and the $\frac{1}{2}$ of $\frac{1}{7}$, doe make $\frac{1}{6}$, which being abreuied doth make $\frac{1}{7}$, which is as much as the $\frac{1}{3}$ and the $\frac{1}{2}$ of $\frac{1}{7}$, being reduced into one fraction. Likewise if you will reduce the $\frac{2}{3}$ and the $\frac{1}{4}$ of $\frac{1}{7}$, you must doe as before, set downe the $\frac{2}{3}$ and $\frac{1}{4}$, with a crosse betweene them, then multiply the two denominators the one by the other, that is to say 3, by 4, maketh 12: which set under the crosse, as you see in the margent: and then multiply the first numerator 2, by the last denominator 4, and thereof commeth 8, whereunto adde the last numerator 1, and that maketh 9, which 9 set over the crosse: so shall you finde that the $\frac{2}{3}$ and the $\frac{1}{4}$, of $\frac{1}{7}$, are worth $\frac{9}{12}$, the which abreuied do make $\frac{3}{4}$, as appeareth by example in the margent.

Reduction

Reduction of whole Numbers and broken together in a Fraction, the which fraction is called an improper fraction.

IF you will reduce whole Number and broken into broken, you shall reduce the whole number into broken as by this example may appeare: if you will reduce 17 $\frac{1}{8}$ into a broken number, first you must multiply the whole number 17 by the denominator of the broken, which is 8, in saying 8 times 17, doe make 136, unto the which you must adde the numerator of $\frac{5}{8}$ which is 5, and all amounteth to 141, which set ouer $\frac{8}{8}$, with a line between them, and they will be $\frac{141}{8}$ so much is 17 $\frac{5}{8}$ worth in an improper fraction, as appeare here by practise.

17	141	
8	$17\frac{5}{8}$	maketh $\frac{141}{8}$
136		
5		
141		

In case you have whole number and broken to be reduced with broken, you must bring the whole number into his broken, in multiplying it by the denominator of the bro-

broken number going therewith, and adde thereunto the numerator of the said broken number, as in the last example is declared, and then reduce that broken number with the other broken. as here appeareth by this example. Reduce $10\frac{1}{3}$ and $\frac{4}{7}$ together, first bring $10\frac{1}{3}$ all into thirds, as it is taught by the first Reduction, and you shall finde $\frac{32}{3}$, then reduce the $\frac{32}{3}$ and $\frac{4}{7}$ together by the first reduction, and you shall find $\frac{224}{21}$ for the $\frac{32}{3}$: and $\frac{12}{21}$ for $\frac{4}{7}$ as appeareth here by practise.

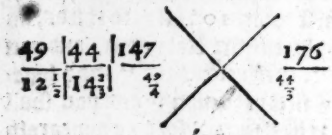
Also in case you have in both parts of your reduction, as well whole number as broken, you must alwayes put the whole of each part into his broken as by the 6 Reduction is taught.

Example.

If you will reduce $12\frac{3}{4}$ with $14\frac{2}{3}$, to bring them into one denomination, first bring the $12\frac{3}{4}$ all into fourths, and you shal find $\frac{49}{4}$: then likewise reduce $14\frac{2}{3}$, all into

thirds

thirds, and you shall have $\frac{44}{3}$, for the $14\frac{2}{3}$: then reduce $\frac{49}{4}$, and $\frac{44}{3}$, together, by the order of the first reduction, and you shall find $\frac{2147}{12}$, for the $\frac{49}{4}$. And $\frac{176}{12}$ for the $\frac{44}{3}$: as here by practice both plainly appeare.



Chap. 3.

Of Abbreviation of one broken number into a lesser broken.

ABbreviation is as much as to set downe. or to write a broken number by figures of lesse signification, and not diminishing the value thereof. The which to doe, there is a rule whose operation is thus, divide the numerator, and likewise the denominator, by one whole number, the greatest that you may finde in the same broken number, and of the quotient of that nu-

numerator, make it the numerator, and likewise of that of the denominator, make it your denominator, as by example.

1 If you will abbreviate $\frac{54}{81}$ you shall understand that the greatest whole number that you may take, by the which you may divide the numerator & the denominator is 27, which is the half of the denominator, and that is a whole number, for you cannot take a whole number out of the denominator 81, which will divide both the numerator and the denominator, but that there will be either more or lesse then a whole number, therefore if you divide 54. by 27, you shall find in the quotient 2 for the numerator: likewise if you divide 81 by 27 you shall have in the quotient 3 for the denominator: then put 2 over the 3, with a line between them, and you shall find $\frac{2}{3}$,

$$\frac{54}{81}$$

$$\begin{array}{l} \cancel{10} \\ \cancel{54}\ (3 \\ 27 \end{array}$$

$$\frac{2}{3}$$

and thus by this rule the $\frac{14}{21}$ are abbrevied unto $\frac{2}{3}$: as appeareth in the margent, and so is to be understanded of all other.

20
81 (3
27

The form and manner how to find the greater number, by the which you may wholly divide the numerator and denominator (to the end ye may abbreviate them) is thus.

First divide the denominator by his numerator, and if any number do remain, let your divisor be divided by the same number, and so you must continue until you have so often times divided, that there may nothing remain, then it is to be understood, that your last divisor (whereat you did end, and that 0 did remain after your last division) is the greatest number, by the which you must abbreviate, as you did in the last example. But in case that your last divisor be 1, it is a token that the

the same number cannot be abbreviated to any lower fraction then you find it at the first. Example of $\frac{54}{81}$ divide 81, which is the denominator by 54 which is his numerator, and there resteth 27, then divide 54 by 27. and there remaineth 0, which is nothing, wherefore your last diviſor 27 is the number by the which you must abbreviate $\frac{54}{81}$: as in the last example is specified.

¶ *Another manner of Abbreviation.*

2 Mediate the numerator, and also the denominator of your Fraction in case the numbers be even, that is to say, take alwayes the half of the numerator, and likewise of the denominator, and of the mediation or halfe of the numerator, make it your numerator, also of halfe the denominator make your denominator, and so continue as often as you may in taking alwayes the half of the numerator, and likewise of the denominator: or else see if you may abbreviate the numbers which do remain by 3, by 4, by 5, 6, 7, 8, 9, or by 10: for you must abbreviate them as often as you can by any of the said numbers. And it is to be noted, that with whatsoever number of these, you doe abbreviate the numerator

of your fraction, by the same you must abbreviate likewise the Denominator, so continuing untill they can no more be abbreviated. And it is to be understood, that if the Numerator and the Denominator be even numbers, as you may know when the first figure is an even number, or 8 or, then may you perceive if both the Numerator and the Denominator may be abbreviated by 10, by 8, by 4, or by 2: albeit that sometimes they may be abbreviated by 3. And if they be odde numbers, then must you consider if they may be abbreviated by 9, by 7, by 5, or by 3: but when the first number as well of the numerator, as of the Denominator are even numbers, then may you well know that such numbers may be abbreviated by 2 as is aforesaid. And if you adde the figures of the numerator together, in such manner as you doe in making the proofe by 9 in whole numbers, that is, if you find it appeareth that you may abbreviate that number by 9, and likewise by 3, and sometimes by 6, if you find 6 it may be abbreviated by 6, and alwaies by 3 if you find 3. it is a sign that you abbreviate by 3. And by whatsoever number that you doe abbreviate the numerator, by the same must you ab-

abbreviate likewise the denominator, and if the first figures of the same number be 5 or 0, you may abbreviate them by 5, but if the first figures be both 0, they may be abbreviated by 10: in cutting away the 2 Ciphers thus, as $\frac{20}{30}$ which maketh $\frac{2}{3}$, and sometimes by 100 thus, as $\frac{100}{200}$, in cutting away the four Ciphers after this sort, $\frac{122}{200}$ and then $\frac{100}{200}$ doe make $\frac{1}{2}$, and after this manner have I set here divers examples, although that all broken numbers cannot be abbreviated by this rule, yet all fractions may be well abbreviated by the first rule aforesaid.

Abbreviated.

$\frac{2110}{7690}$ by 10. $\frac{1872}{4795}$ by 9.

$\frac{124}{768}$ by 8. $\frac{210}{525}$ by 7.

$\frac{42}{90}$ by 6. $\frac{10}{75}$ by 5.

$\frac{8}{20}$ by 4. $\frac{6}{15}$ by 3

$\frac{6}{8}$ by 2. $\frac{2}{3}$

$\frac{1}{2}$

3 Furthermore you shall understand that sometimes it happeneth that all the figures of the numerator are equall unto them of the denominator, which when it so happeneth you may then take one of them of the numerator, and also one of them of the denominator, and it shall be observed as $\frac{111}{888}$ being abbreviated after this manner $\frac{1}{8}$. And yet it happeneth sometimes, that five or many figures of the numerator are proportionall unto 4 or many figures of their denominator, and that the other figures of the same number are the figures one by the other in this proposition following. When may you take two or more figures, as well of the numerator as of the denominator, and by this number the same number shall be abbreviated, as $\frac{4747}{3939}$ being abbreviated by this rule, doe come to $\frac{47}{39}$.

4 Also it happeneth sometimes, that you would abbreviate one number unto the semblance or likenesse of another: And for to know if the same may be abbreviated, and also by what number it may be abbreviated, you must divide the numerator of one number by the numerator of the other: & likewise the denominator of the one, by the denominator of the other, for in

in case that after every division there doe remain 0, and that the two quotients be equall, then is one of them the number by the which the said fraction must be abbreviod, as by example of $\frac{115}{207}$. I would know if they may be abbreviod unto $\frac{5}{9}$, and for to doe this you must divide 115 by 5, and you must divide 207 by 9, and there will come into both the quotients 23 by the which it appeareth that this fraction may be abbreviod by 23.

	20		
$\frac{115}{207}$	115	20	
$\frac{5}{9}$	0 55 (23	207	
		99	23

The fourth Chapter treateth of the adding of two or many broken numbers together, as by example.

TO adde Fractions or broken numbers together, there is a generall rule which is thus. If the numbers bee of unlike denominations the one to the other, you must reduce them into a common denomination by the doctrine of the first reduction: and when you have reduced them you must then adde both the numerators together, and set the product of the said addition over the crosse, and divide the same Numerator by the common denominator, as by this example following.

1 If you will adde $\frac{2}{3}$ with $\frac{1}{4}$, you must first reduce the two fractions both into one denomination, according to the order of the first reduction, that is to say, in multiplying the denominator of the first fraction which is 3, by the Denominator

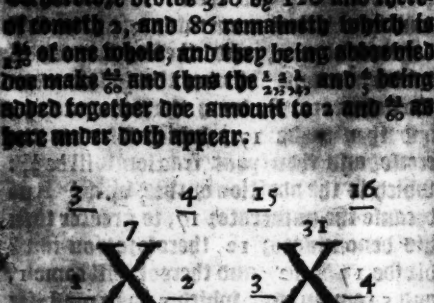
of

of the other fraction which is 4, & they make 12 for your common denominator: the which 12 you shall set under the crosse, then multiply the first numerator 2 by the last denominator 4, and thereof cometh 8, which set over the $\frac{2}{3}$ and then multiply the last numerator 3, by the first denominator 3, and thereof cometh 9, which you must set over the $\frac{3}{4}$: then adde the numerator 8, with the numerator 9, and they make 17, which set over the crosse, and then your fraction will be $\frac{17}{12}$: which is the addition of the $\frac{2}{3}$ with $\frac{3}{4}$. And because the numerator 17, is greater then his denominator 12, therefore you must divide 17 by 12: and thereof will come 1, and 5 remaining, which 5 you must set apart, and 12 under the same, with a line between them, and they are worth $1\frac{5}{12}$, and so much are the $\frac{2}{3}$ added with $\frac{3}{4}$ as both appeare.

Addition in broken numbers.

2 Also if you will adde $\frac{2}{3}$ $\frac{3}{4}$ and $\frac{5}{7}$ toge-
ther,

ther, you muſt firſt adde the $\frac{1}{2}$ and $\frac{2}{3}$ together, according to the doctrine of the laſt rule, and you ſhall find $\frac{7}{6}$ then adde $\frac{3}{4}$ and $\frac{4}{5}$ together by the ſaid laſt rule, and they make $\frac{31}{20}$. Then finally adde the $\frac{7}{6}$ (which came of the $\frac{1}{2}$ and $\frac{2}{3}$ added together) with $\frac{31}{20}$, which came of the $\frac{3}{4}$ and $\frac{4}{5}$ added together, and you ſhall find by the aforeſaid addition that they amount unto $\frac{326}{120}$. Wherefore divide 326 by 120 and thereof cometh 2, and 86 remaineth which is $\frac{86}{120}$ of one whole, and they being abbreviated doe make $\frac{43}{60}$ and thus the $\frac{1}{2}$ $\frac{2}{3}$ $\frac{3}{4}$ and $\frac{4}{5}$ being added together doe amount to 2 and $\frac{43}{60}$ as here under both appear.



Addition of broken number of broken.

3 Furthermore, if you will adde the broken numbers of broken together, as to adde the $\frac{2}{3}$ of $\frac{4}{5}$ with the $\frac{1}{6}$ of $\frac{1}{2}$ of $\frac{3}{8}$: first you must reduce the numbers according to the order of the fourth reduction, in multiplying the numerators of the first 3 fractions, the one by the other, and of the product make your numerator, and likewise you must multiply the denominators of the foresaid three fractions, the one by the other, and of the product make your denominator, and you shall find $\frac{24}{60}$ for the first three broken numbers, the which being abbreviated doe make $\frac{2}{5}$, then reduce the other 3 fractions, by the said fourth reduction, in multiplying the numerators by numerators, and denominators, by denominators, as you did by the first 3 broken numbers aforesaid, and you shall finde $\frac{24}{60}$ then must you adde the $\frac{2}{5}$ which came of the first 3 broken numbers, and $\frac{24}{60}$ which are come of the last 3 fractions, both together, by the instruction of the first Addition: and you shall find $\frac{144}{480}$ which cannot be abbreviated, but is the full product of the addition: so must you adde $\frac{2}{3}$ of $\frac{4}{5}$ added with the $\frac{1}{6}$ of $\frac{1}{2}$

$\frac{1}{8}$

$\frac{2}{8}$ as hereafter by practise both evidently appeare.

$$\frac{24}{\frac{2}{3},\frac{1}{4},\frac{4}{3}} \quad \frac{25}{\frac{1}{6},\frac{1}{2},\frac{4}{8}}$$

$$60 \qquad \frac{1}{2} \qquad 96$$

$$317$$

$$\frac{192}{\frac{2}{5}} \times \frac{125}{\frac{25}{96}} \quad \frac{317}{480}$$

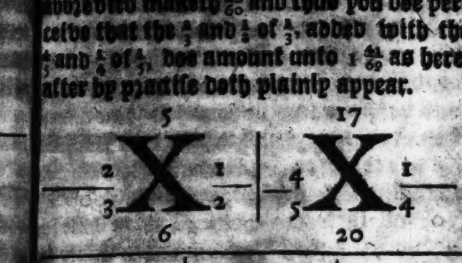
$$480$$

Addition of broken numbers and parts of broken, with broken, and the parts of broken together.

4. Likewise if you will adde the $\frac{2}{3}$ and the $\frac{1}{2}$ of $\frac{1}{3}$, with the $\frac{4}{5}$ and $\frac{1}{4}$ of $\frac{1}{5}$, you must reduce the $\frac{21}{32}$ first into one fraction by the doctrine of the fift reduction, and thereof cometh $\frac{1}{6}$, for the $\frac{2}{3}$ and $\frac{1}{2}$ of the said thirds: then reduce the $\frac{4}{5}$ and $\frac{1}{4}$ by the said fift reduction, and thereof cometh $\frac{17}{20}$.

Last of all adde the $\frac{1}{6}$ and $\frac{17}{20}$ together according to the first rule of Addition: and you shall find $\frac{121}{120}$ which being divided by ingeth

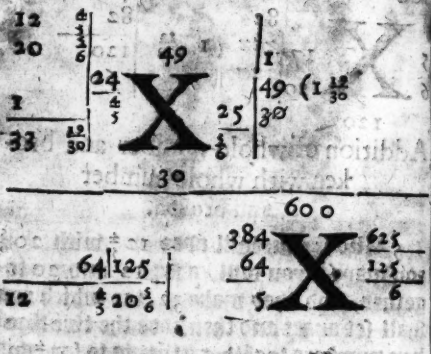
bringeth 1. & $\frac{42}{120}$ part remaining, which abbreuiated maketh $\frac{21}{60}$ and thus you doe perceiue that the $\frac{2}{3}$ and $\frac{1}{2}$ of $\frac{1}{3}$ added with the $\frac{4}{5}$ and $\frac{1}{4}$ of $\frac{1}{5}$, doe amount unto $1\frac{21}{60}$ as hereafter by practise both plainly appear.



Addition of whole number and broken with whole number and broken.

5 Also if you will adde $12\frac{2}{3}$ with $20\frac{1}{5}$ you may (if you will) adde 12 and 20 together, and they make 32, the which you shall set apart and then adde the two broken numbers together, that is to say $\frac{2}{3}$ and $\frac{1}{4}$ by the order of the first addition, and they make $\frac{42}{30}$: therefore diuide 49 by 30, and thereof cometh 1 and $\frac{12}{30}$ parts remain, which

which 1 you must adde unto the 32, which were put apart, and the whole addition will be $33\frac{19}{30}$. Or otherwise, you may reduce $12\frac{4}{5}$ into the likenesse of a Fraction by the order of the first reduction, and they will be $\frac{64}{5}$ and likewise by the same reduction, reduce $20\frac{5}{6}$ and they be $\frac{125}{6}$ then adde $\frac{64}{5}$ with the $\frac{125}{6}$ by the first addition, and you shall find $\frac{1009}{30}$ Therefore divide 1009 by 30, and thereof cometh $33\frac{19}{30}$ as before, as by practise of the same both wales, doth hereafter appeare.



The

The fift Chapter treateth of Substraction in broken numbers.

1 If you will substract $\frac{2}{3}$ from $\frac{3}{4}$, you must first reduce both the fractions into a common denomination, by the doctrine of the first reduction, and you shall find $\frac{6}{12}$ for the $\frac{2}{3}$ and $\frac{9}{12}$ for the $\frac{3}{4}$. Therefore abate the numerator 8 from the numerator 9, and there will remain 1, which 1 you must set over the crosse, and the same is $\frac{1}{12}$, and so much is the rest of that substraction, as may appear here by practise.

$$\begin{array}{ccc} \frac{8}{1} & & \frac{9}{} \\ \frac{2}{3} & \times & \frac{3}{4} \\ & 12 & \end{array}$$

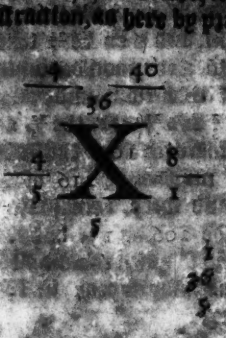
2 But if you have a broken number to be substracted from a whole number, you must borrow 1 unit of the whole number, and resolve it into a fraction of like denomination, as is that fraction, which you would abate from the same whole number, and then abate the said fraction therefrom, and you shall find what doth remain, as by this example. If you abate $\frac{6}{5}$ from 8, you must

must borrow one of the said 8, and resolve it into fifties like unto the fraction, because it is $\frac{4}{5}$, & that 1 will be 5 fifts thus, $\frac{5}{5}$ therefore abate $\frac{4}{5}$ from $\frac{5}{5}$ and there will remain $\frac{1}{5}$, and subtract the 1 which you borrowed from 8, and there doth remain 7, and the $\frac{1}{5}$ also which remained after the said $\frac{4}{5}$ were abated. Thus the $\frac{4}{5}$ being subtracted from 8, doth leave $7\frac{1}{5}$ as by practise doth plainly appeare.

$$\begin{array}{r} 8 \\ \frac{1}{5} \\ \hline 7\frac{1}{5} \end{array} \qquad \begin{array}{ccc} & 20 & 25 \\ & 5 & \\ \frac{4}{5} & \times & \frac{5}{5\frac{1}{5}} \\ & 25 & \end{array}$$

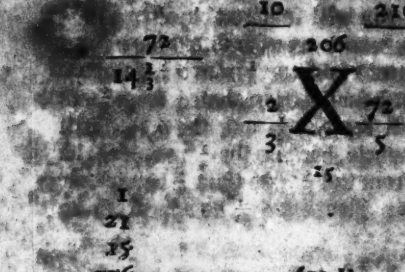
Or otherwise you shall put 1 under 8 with a line between, and that will be $\frac{1}{1}$, then set down the $\frac{4}{5}$ and the $\frac{1}{1}$ with a crosse between them, then you must reduce them into one denomination by the first reduction, and you shall find 4 over the $\frac{4}{5}$ and 40 over the $\frac{1}{10}$ then subtract the said 4 from 40, and there will remain 36, the which you shall set over the crosse, and they doe make $\frac{36}{5}$ Likewise you must multiply the denominator 5 by 1, maketh 5, set that under the crosse, then divide 36 by 5, and thereof will

will come $7\frac{1}{5}$ as before, for the rest of that substraction, as here by practise appeareth.



3. If you will substract broken number from whole number and broken if you would substract $\frac{1}{4}$ from $6\frac{1}{60}$, you may by the first substraction abate $\frac{1}{4}$ from $\frac{1}{60}$ and there will remain $\frac{1}{120}$ and the 6 doth still remain whole, because the $\frac{1}{4}$ may well be abated from the $\frac{1}{60}$ and thus $\frac{1}{4}$ being abated from $6\frac{1}{60}$ leaveth $6\frac{1}{120}$ as appeareth by practise.

Likewise if you will abate $\frac{2}{3}$ from $14\frac{2}{3}$, you must first reduce $14\frac{2}{3}$ all into thirds by the 6 reduction, and they be $\frac{72}{5}$ then reduce $\frac{2}{3}$ and $\frac{72}{5}$ into a common denomination, by the first reduction, and you shall finde $\frac{10}{15}$ for the $\frac{2}{3}$ and $\frac{216}{15}$ for the $\frac{72}{5}$: then substract the numerator 10 of the first fraction, from the numerator 216 of the second fraction, and there remaineth $\frac{206}{15}$, Wherefore divide 206 by 15, and thereof cometh $13\frac{11}{15}$ and so much remains of this Substraction, as may appear in the example following.



4. If you will substract whole number and broken from whole and broken, as thus,

thus, if you will substract $9\frac{3}{4}$, from $20\frac{1}{2}$, you must reduce $9\frac{3}{4}$ into fourths, and likewise the $20\frac{1}{2}$ into halfes, by the sixth reduction: and you shall finde $\frac{37}{4}$ for the $9\frac{3}{4}$: and $\frac{41}{2}$ for the $20\frac{1}{2}$. Then reduce $\frac{37}{4}$, and $\frac{41}{2}$ into one denomination, according unto the first reduction and you shall find $\frac{74}{8}$ for the $\frac{37}{4}$, and $\frac{164}{8}$ for the $\frac{41}{2}$, then abate the numerator of $\frac{74}{8}$ which is 74, from 164 which is the numerator of $\frac{164}{8}$ and there remaineth $\frac{90}{8}$, then divide 90 by 8, and thereof cometh $11\frac{2}{4}$ which is the remain of this substraction.

$$\frac{37}{9\frac{3}{4}} \quad \Big| \quad \frac{41}{20\frac{1}{2}}$$

$$\frac{74}{90} \quad \frac{164}{}$$

$$\frac{37}{4} \times \frac{41}{2}$$

8

$$\begin{array}{r} 164 \\ 74 \\ \hline 90 \end{array} \qquad \begin{array}{r} 12 \\ 90 \\ 88 \end{array} \qquad (11\tfrac{2}{4}$$

Subſtraction of broken Numbers, of broken from Fractions of Fractions.

5. If you will ſubſtract the $\frac{1}{3}$ of $\frac{2}{3}$ of $\frac{2}{5}$ from the $\frac{1}{6}$ of $\frac{1}{4}$ of $\frac{7}{8}$, you muſt firſt bring the $\frac{1}{3}$ of $\frac{2}{3}$ into one Fraction, by the third reduction: and the $\frac{2}{5}$ of $\frac{1}{4}$ of $\frac{7}{8}$, likewiſe into one Fraction by the ſame reduction, and you ſhall finde $\frac{2}{30}$ for the firſt three broken numbers, which being abbrevied doe make $\frac{1}{15}$: and for the other three broken Numbers, you ſhall finde $\frac{111}{320}$: which being likewiſe abbrevied, doe make $\frac{35}{64}$ then you ſhall ſubſtract $\frac{1}{5}$ from $\frac{35}{64}$ by the inſtruction of the firſt Subſtraction in reducing both the Fractions into a common denomination, as before is done, and you ſhall find remaining $\frac{111}{320}$ as may appear by example.

6				105		
1/2	2/3	2/5		1/6	1/4	7/8
	30		1/15		192	35/64

64 175

111

$\frac{1}{5}$ X $\frac{35}{64}$

320

175

64

111

The

¶ The sixth Chapter is of Multiplication in broken Numbers.

First for to multiply in broken number, there is a rule, which is this, you must multiply the numerator, of the one Fraction, by the numerator of the other. And likewise you must multiply the Denominator of the one by the Denominator of the other. And then divide the Fraction if it may be divided, or else abbreviate it, if it may be abbreviated, and it is done. But if there be whole number and broken together, you must reduce the whole numbers into their broken, and adde thereunto the Numerator of his broken, and then multiply as it is before said, as also hereafter by examples shall more plainly appeare.

1. If you will multiply $\frac{2}{3}$ by $\frac{1}{4}$, you must multiply the Numerator 2 by the Numerator 3, and thereof cometh 6 for the Numerator. Likewise you must multiply the denominators the one by the other, that is to say, 3 by 4. and thereof cometh 12 for the Denominator: so that this Multiplication cometh to $\frac{6}{12}$ which being

abbrevied doe make $\frac{1}{12}$: and so much amounteth the multiplication of the $\frac{1}{3}$ by $\frac{1}{4}$ as by practise appeareth.

6

$\frac{1}{3}$ $\frac{1}{4}$ $\frac{1}{12}$

2

2. Likewise if you will multiply a broken number by whole number or whole number by broken, which is all one, as $\frac{4}{5}$ by 18, or else 18 by $\frac{4}{5}$, you must set 1 under 18 thus, $\frac{18}{1}$: and then multiply the numerator 18 by the numerator 4, and thereof cometh 72. Likewise multiply the Denominator 5 by the Denominator 1, and thereof cometh 5, then divide 72 by the Denominator 5, and therof cometh $14\frac{2}{5}$: for the whole multiplication. Or otherwise, abate from 18 his $\frac{1}{5}$ part, which is $3\frac{3}{5}$ and there remaineth $14\frac{2}{5}$, as hereafter followeth.

72 2

$\frac{4}{5}$ 18 72 $14\frac{2}{5}$

5 72

Otherwise.

18 3 18

$\frac{4}{5}$ 18 ($3\frac{3}{5}$ $\frac{3}{5}$

5 3 14 $\frac{2}{5}$

3. Also

3. Also if you will multiply a whole number, by whole number and broken, or else whole number and broken by a whole number, which is all one, as by example: if you will multiply 15 by $16\frac{1}{4}$, or else $16\frac{1}{4}$ by 15: First reduce $16\frac{1}{4}$ all into fourths, in multiplying 16 by the Denominator of $\frac{1}{4}$ which is 4, and thereof cometh 64, whereunto adde the Numerator 3, and it maketh $\frac{67}{4}$: which multiply by 15 according to the instruction of the last example, and you shall finde the Product of this multiplication to be $251\frac{1}{4}$, as by following practise doth appeare.

67	1005	67	251	81
$16\frac{1}{4}$	$\frac{67}{4}$ $\frac{15}{1}$	15	1005	($251\frac{1}{4}$
	4	335	444	
		67		
		1005		

4. And if you will multiply a broken number by whole number and broken, or else whole number and broken by a broken. As by example, if you will multiply $\frac{1}{4}$ by $18\frac{1}{3}$, or else $18\frac{1}{3}$ by $\frac{1}{4}$, which is all one:

you muſt reduce the whole number into his broken by the firſt reduction. And you ſhall finde $\frac{16}{3}$, which you ſhall multiply by the $\frac{3}{4}$ after the Doctrine of the firſt Multiplication, that is to ſay: In multiplying the Numerator 56. by the Numerator 3, which is 168, and it is ſtill 56, becauſe 1 doth neither multiply nor divide. And likewiſe you muſt multiply the Denominator 3. by the Denominator 4, and it maketh 12: then divide 56 by 12, and thereof cometh $4\frac{8}{12}$. And ſo much amounteth the multiplication of the ſaid $18\frac{3}{4}$ multiplied by $\frac{3}{4}$ by example.

5. If you will multiply whole number and broken, with whole and broken, you muſt firſt put either whole number into his broken, according to the inſtruction of the firſt reduction: and then multiply the one numerator by the other. And of the product make your numerator. And likewiſe multiply the Denominators the ons by the other, and thereof make the De-

Denominator, then divide the Numerator by the Denominator, and the quotient shall be the encrease of this Multiplication. Example. If you would multiply $12\frac{2}{5}$ by $6\frac{1}{4}$: first by the first reduction the $12\frac{2}{5}$ will make $\frac{64}{5}$: and the $6\frac{1}{4}$ will make $\frac{27}{4}$, then multiply the Numerator 64, by the Numerator 27, and thereof cometh 1728 for the Numerator. And then you must multiply the Denominator 5, by the Denominator 4, and they doo make 20: then divide 1728, by 20, and thereof cometh $86\frac{8}{20}$, for the whole Multiplication, as by example.

1728		64	27
64	27	27	
$12\frac{2}{5}$	$6\frac{1}{4}$	448	
		128	
20		1728	

1728
200 ($86\frac{8}{20}$

6. If you will multiply one broken number by many broken numbers, thus: As to multiply $\frac{2}{3}$ by $\frac{3}{7}$ and by $\frac{2}{5}$ you must multiply the Numerators of all the Fractions the one by the other, and of the Product make the Numerator, that is to say,

fay, 2 by 5, and they be 10, then 10 by 4, and they be 40 for the Numerator. Likewise you muſt multiply the Denominators the one by the other, that is to fay 3 by 7 maketh 21, then 21 by 9 maketh 189 for the Denominator: then ſet 40 over the 189 with a line betweene them, and they make $\frac{40}{189}$. And ſo much amounteth the whole multiplication of the 3 multiplied by $\frac{2}{3}$ and $\frac{4}{7}$ as by example following. And thus is to be underſtood of all ſuch like.

The 7 Chapter treateth of Diviſion in broken Numbers.

NOte that in Diviſion of broken numbers, you muſt ſet your diviſor down firſt next unto the left hand, and the dividend or number which is to be divided alwayes towards the right hand.

hand. And then multiply crosse-wise, that is to say, the Numerator of your Divisor by the Denominator of the Dividend: and the Product shall be the Denominator, which afterwards shall be your Divisor. And likewise you must multiply the Denominator of your first number, that is to say, of your first Divisor by the Numerator of the Divisor: which afterwards shall be the Dividend, and that must be set over the Crosse, and the Denominator under the Crosse, then divide the Numerator by the Denominator if it may be divided, if not, you must abbreviate them, as hereafter by examples shall more plainly appear.

1. If you will divide $\frac{2}{3}$ by $\frac{3}{4}$, you must set the Divisor (which is $\frac{3}{4}$) next to the left hand, and the Dividend $\frac{2}{3}$ towards your right hand, with a crosse between them: as may appear by this example in the margent. Then you shall multiply the numerator of the $\frac{2}{3}$, which is 2 by the Denominator of the $\frac{3}{4}$ which is 4, and thereof cometh 8 which shall be your new Divisor: set that

that 8 under the Crosse, as the Denominator: then multiply the numerator of the Dividend, that is to say, of the $\frac{3}{4}$ which is 3 by the Denominator of the Divisor, that is to wit, of the $\frac{2}{3}$ which is 3 and thereof cometh 9, set the 9 over the Crosse of the Numerator: which shall be now the dividend or number to bee divided. Then finally you shall divide 9, by 8: and thereof cometh into the quotient 1 $\frac{1}{8}$, and so oftentimes is $\frac{2}{3}$ contained in $\frac{3}{4}$, as doth appear before in the margent. But in case you would divide $\frac{2}{3}$ by $\frac{3}{4}$, you must likewise set your Divisor $\frac{3}{4}$ next to your left hand as is before said. And then proceed as is above declared, and you shall finde that $\frac{2}{3}$ divided by $\frac{3}{4}$ bringeth into the quotient $\frac{8}{9}$, which cannot bee divided nor abbreviated. Wherefore it appeareth that $\frac{2}{3}$ being divided by $\frac{3}{4}$ bringeth but $\frac{8}{9}$ of one unite into the quotient, as doth appear.

2. Likewise

2. Likewise if you will divide a broken number by a whole number, or else a whole number by a broken, as to divide $\frac{3}{4}$ by 13, you shall put 1 under 13, and it will be $\frac{13}{1}$ for your Divisor, set that toward your left hand, and then multiply 13 by 4 according to the first Division, and thereof will come 52, for the Denominator, set that under the crosse: and multiply 3 by one, maketh 3, for the numerator: set that over the cross, and it is $\frac{3}{52}$, as appeareth above.

$$\begin{array}{ccc} & 3 & \\ \frac{13}{1} & \times & \frac{3}{4} \\ & 52 & \end{array}$$

But if you will divide 13 by $\frac{3}{4}$, then set the $\frac{3}{4}$ next your left hand, and put 1 under 13, as in the last example, and it is $\frac{13}{1}$, set that toward your right hand thus, as appeareth in the margent, and then work according to the doctrine of the first Division, and you shall find that 13 being divided by $\frac{3}{4}$ bringeth into the quotient $\frac{52}{3}$, then divide 52 by 3, and thereof cometh 17 $\frac{1}{3}$, and so oftentimes is $\frac{3}{4}$ contained in 13, as doth appear.

$$\begin{array}{ccc} & 52 & \\ \frac{3}{4} & \times & \frac{13}{1} \\ & 3 & \end{array}$$

$$\begin{array}{l} 21 \\ 52 \\ 33 \quad (17\frac{1}{3} \end{array}$$

3. And if you will divide whole number by whole number and broken, or else whole

whole number and broken by whole number, as to divide 20 by $5\frac{5}{6}$ you shall reduce $5\frac{5}{6}$ into broken, by the first rewation, and it maketh $\frac{35}{6}$ for your divisor, then put 1 under 20, and it will be $\frac{20}{1}$ then shall you multiply 35. by 1, and 20 by 6, as ye taught in the other divisions, and you shall have $\frac{120}{35}$: then divide 120 by 35, and you shall find in your quotient 3, and $\frac{15}{35}$, the which $\frac{15}{35}$ being abbrebiated, is $\frac{3}{7}$, and so many times is $5\frac{5}{6}$ contained in 20. as in the margent appeareth.

$$\frac{35}{6} \times \frac{20}{1} = \frac{120}{35}$$

35
1
35
120 (3
317
35

But if you will divide $5\frac{5}{6}$ by 20, you shall have $\frac{35}{120}$, then you must divide 35 by 120, which you cannot divide, wherefore you shall abbrebiate $\frac{35}{120}$, and therefore cometh $\frac{7}{24}$ for your quotient.

4. If you will divide a broken number, by whole number and broken, or else whole number and broken by a broken number. As to divide $\frac{5}{6}$ by $13\frac{1}{3}$ you must reduce $13\frac{1}{3}$ into his broken, by the first rewation, and they be $\frac{40}{3}$ for your divisor, then multiply 40 by 6, and they make 164 for your denominator, likewise multiply

tiply 3 by 3, and they make 9 for the numerator, and then will your summe be $\frac{9}{164}$, as appeareth in the worke here noted.

$$\begin{array}{c} 41 \\ 13\frac{2}{3} \end{array} \qquad \begin{array}{c} 9 \\ \frac{41}{3} \times \frac{3}{4} \\ 164 \end{array}$$

But if you will divide $13\frac{2}{3}$ by $\frac{3}{4}$, then you must divide 164 by 9, and you shall find $18\frac{2}{9}$.

5. If you will divide whole number and broken, by whole number and broken, as to divide $7\frac{3}{4}$ by $13\frac{2}{3}$, you must reduce the whole numbers into their broken, by the doctrine of the sixt reduction: and you shall find $\frac{31}{4}$, for the $7\frac{3}{4}$, and $\frac{41}{3}$ for the $13\frac{2}{3}$. Then set downe $\frac{41}{3}$ toward the left hand, because it is your divisor, and the $\frac{31}{4}$ towards the right hand, and multiply 41 by 4, for your denominator: and thereof commeth 164. Likewise multiply 31 by 3, for your numerator, and it amounteth to 93: the which will be thus $\frac{93}{164}$ as before doth appeare.

$$\begin{array}{c} 93 \\ \frac{41}{3} \times \frac{31}{4} \\ 164 \end{array}$$

But if you will divide $13\frac{2}{3}$ by $7\frac{3}{4}$ you must

must (contrariwise to the other example) divide 164 by 93: and you shall find in the quotient $1\frac{21}{93}$.

6. The broken numbers of broken must be divided in such manner as broken numbers are, and there is no difference, saving onely that of divers and many broken numbers, you must make but two broken numbers, that is to say, the one for the divisor, and the other for the dividend, or number that is to be divided: example. If you will divide the $\frac{3}{4}$ of $\frac{1}{5}$ of $\frac{1}{2}$, by the $\frac{3}{7}$ of $\frac{4}{7}$ you must understand, that for the first, the $\frac{3}{4}$ of $\frac{1}{5}$ of $\frac{1}{2}$, are $\frac{9}{40}$ by the 3 Reduction: and the $\frac{3}{7}$ of $\frac{4}{7}$, are by the same reduction $\frac{8}{21}$, then have you $\frac{8}{21}$ for your divisor, and $\frac{9}{40}$ for your number to be divided, then multiply 8 by 40, which maketh 320, set that under the crosse, and multiply 9 by 21, and thereof commeth 189: which set over the crosse for the numerator, and they make $\frac{189}{320}$ for his division, as both appear.

$$\begin{array}{ccc} & 189 & \\ \frac{8}{21} & \times & \frac{9}{40} \\ & 320 & \end{array}$$

But if you would divide $\frac{8}{21}$ by $\frac{9}{40}$, you must worke contrary to the last example, that is to say, you must divide 320 by 189: and thereof commeth in the quotient $1\frac{111}{189}$.

Chap.

Chap. 8.

Treateth of Duplation, Triplation, Quadruplation of all broken numbers.

IF you will double any broken number, you shall divide the same by $\frac{1}{2}$: likewise if you will triple any fraction, you must divide it by $\frac{1}{3}$. And for to quadruple any broken number, you shall divide it by $\frac{1}{4}$ and so is to be understood of all other.

Example of Duplation.

IF you will double $\frac{3}{8}$ you shall divide $\frac{3}{8}$ by $\frac{1}{2}$, and thereof cometh $\frac{6}{8}$, which being abbrevied, are $\frac{3}{4}$: as by example.

$$\frac{1}{2} \overset{6}{\underset{8}{\times}} \frac{3}{8}$$

Or otherwise, in case the denominator of any fraction be an even number, you may take halfe the said denominator, without any other operation, & the numerator to abide still the numerator, unto the said halfe of the denominator of the fraction, as by the other example before rehearsed, that is to say, of $\frac{3}{8}$ take $\frac{1}{2}$ of 8, which is 4: and that is

the denominator, and 3 remaineth still numerator to 4 and it maketh $\frac{1}{4}$, and so of all other. But in case the denominator be an odde number, that is to say, not even, then you may multiply the numerator by 2, or else double the numerator, which is all one, & that fraction shall be doubled. Example, if you will double $\frac{3}{5}$, you must only multiply the numerator 3, by 2, and they by 6, which maketh that fraction to be $\frac{6}{5}$, the which 6 being divided by 5, bringeth $1\frac{1}{5}$ and so much is the double of $\frac{3}{5}$.

Example of Triplation.

If you will triple $\frac{2}{5}$, you must divide $\frac{2}{5}$ by $\frac{1}{5}$, & thereof cometh $\frac{2}{5}$ which being divided bringeth $1\frac{4}{5}$, or otherwise, because the denominator is an odde number, you may multiply the numerator 3 by 3, & thereof cometh 9, which maketh $\frac{9}{5}$, as before appeared.

Example of Quadruplation.

If you will quadruple $\frac{4}{5}$ you shall divide $\frac{4}{5}$ by $\frac{1}{5}$, & thereof cometh $\frac{16}{5}$, which 16 being divided by 5 bringeth $3\frac{1}{5}$, or otherwise, because the denominator of the fraction is an odde number, you shall multiply the numerator of the $\frac{4}{5}$, that is to say, 4 by 4, and thereof cometh 16: the which divide by 5,

and

and you shall find $3\frac{1}{5}$, as before. And this sufficeth for Duplation, Triplation, and Quadruplation.

Chap. 9.

Of the proofes of broken Numbers, And first of Reduction.

IF you do abbreviate the broken numbers which be reduced, you shall returne them into their first estate: as by example, if you reduce $\frac{2}{3}$ with $\frac{4}{5}$ you shall find $\frac{10}{15}$, and $\frac{12}{15}$, then abbreviate $\frac{10}{15}$, and you shall find $\frac{2}{3}$, abbreviate likewise $\frac{12}{15}$, and thereof cometh $\frac{4}{5}$ as before.

The proofe of Abbreviation.

IF you doe multiply that number which you have abbrevied, by that or those numbers, by the which you have abbrevied the, you shall return them again into their first estate. Example, if you will abbreviate $\frac{16}{48}$ by 16, in taking the $\frac{1}{16}$ part both of the numerator and also of the denominator, you shall find $\frac{2}{3}$, the proofe is thus, you must multiply both the numerator and denominator of $\frac{2}{3}$, that is to say, 3 by 16 maketh 48 for the denominator, and 2 by 16, maketh

32 for the numerator: then set the numerator 32, over the denominator 48, and they be $\frac{32}{48}$ as before.

If you doe substract one of the numbers, or many of them (which you have added) from the totall summe, there shall remaine the other, or others Example, if you doe adde $\frac{1}{3}$ with $\frac{1}{4}$, you shall find $\frac{7}{12}$. The proof is, if you substract $\frac{1}{3}$ from $\frac{7}{12}$, you shall find remaining the other number, which is $\frac{1}{4}$, or else if you doe substract $\frac{1}{4}$ from $\frac{7}{12}$, there will remaine the other number which is $\frac{1}{3}$.

The proof of Substraction.

If you doe adde that number which remaineth, with the number which you did substract, you shall find the totall summe, out of the which you made the abatement: or otherwise, if you adde the two lesser numbers together, you shall find the greater. Example: if you substract $\frac{1}{4}$ from $\frac{2}{3}$, there will remaine $\frac{1}{12}$. The proof is thus, you must adde $\frac{1}{12}$ & $\frac{1}{4}$ together and you shall find $\frac{16}{48}$, the which being abbrevied, doth make $\frac{1}{3}$ which is the greatest number.

The proof of Multiplication.

If you divide the product of the whole multiplication, by the multiplicator, you shall

shall find in your quotient, the multiplicand or number the which you have multiplied: or else if you divide the totall sum which is come of the multiplication, by the multiplicand, you shall find in the quotient the multiplicator. Example: If you multiply $\frac{2}{3}$ by $\frac{4}{5}$, the product of this multiplication will be $\frac{8}{15}$. The proof is thus: you shall divide $\frac{8}{15}$ by the multiplicator $\frac{4}{5}$, and thereof cometh $\frac{2}{3}$, which is the multiplicand: or else divide $\frac{8}{15}$ by $\frac{2}{3}$, and you shall find the $\frac{4}{5}$, which is the multiplicator.

The proof of Division.

If you doe multiply the quotient by the divisor, you shall find the number which you did divide, that is to say, your dividend. Example: If you divide $\frac{2}{3}$ by $\frac{3}{4}$ your quotient will be $\frac{8}{9}$. The proof is thus, you must multiply $\frac{8}{9}$ by $\frac{3}{4}$, and thereof cometh $\frac{24}{36}$, which being abbreviated are $\frac{2}{3}$, which is your dividend, and by this manner all whole numbers have their proofs as well as broken numbers.

Chap. 16.

Of certain Questions done by broken numbers. And first by Reduction.

FInd two numbers, whereof the $\frac{3}{7}$ of the one number, may be equall unto the $\frac{1}{8}$ of the other. Answ. You shall reduce $\frac{3}{7}$ and $\frac{1}{8}$ crosse-wise, & you shall find 16 over the $\frac{3}{7}$, and 21, over the $\frac{1}{8}$, which are the two numbers that you seek: for the $\frac{1}{8}$ of 16 are 6: and so are the $\frac{3}{7}$ of 21, likewise 6: wherefore you may perceive that the $\frac{1}{8}$ of 16 which are 6, are equall unto the $\frac{3}{7}$ of 21, which is also 6.

2. Find two numbers, whereof the $\frac{2}{3}$ of the one, may be double to the $\frac{1}{4}$ of the other. Answer. Double $\frac{1}{4}$, and you shall have $\frac{2}{4}$, which being abbrevied is $\frac{1}{2}$: then reduce $\frac{2}{3}$ and $\frac{1}{2}$ crosse-wise, and you shall find 4 over the $\frac{2}{3}$, and 3 over the $\frac{1}{2}$, which are the two numbers that you seek: for the $\frac{2}{3}$ of 3, which is 2 is double unto the $\frac{1}{4}$ of 4, which is but 1.

3. Find two numbers whereof the $\frac{2}{3}$ & the $\frac{1}{4}$ of the one, may be equall unto the $\frac{1}{4}$ & $\frac{1}{3}$ of the other, Answer. Adde the $\frac{2}{3}$ and $\frac{1}{4}$ together, and they make $\frac{7}{12}$, then adde $\frac{1}{4}$ and $\frac{1}{3}$ together, and they are $\frac{2}{20}$ then reduce $\frac{7}{12}$ and $\frac{2}{20}$ crosse-wise, and you shall have 140 over

over the $\frac{7}{12}$, and 108 over the $\frac{1}{20}$, which are the two numbers that you seek. For 63 which are the $\frac{7}{12}$ of 108, are also the $\frac{9}{20}$ of 140.

4. Find two numbers, whereof the $\frac{1}{2}$ the $\frac{1}{3}$ & the $\frac{1}{4}$ of the one of them, may be equall unto the $\frac{1}{5}$ & $\frac{1}{6}$ & $\frac{1}{7}$ of the other number. Anſ. First you muſt adde $\frac{1}{2}$, $\frac{1}{3}$, & $\frac{1}{4}$ together, and they make $\frac{13}{12}$: then adde $\frac{1}{5}$, $\frac{1}{6}$, & $\frac{1}{7}$ together, and they make $\frac{107}{210}$. Then reduce $\frac{13}{12}$ and $\frac{107}{210}$ croſſe-wiſe, as by the firſt queſtion of reduction, and you ſhall find 2730 over the $\frac{13}{12}$, and 1284 over the $\frac{107}{210}$, which are the two numbers that you ſeek: for 1391 which is the $\frac{1}{2}$ the $\frac{1}{3}$ the $\frac{1}{4}$ of 1284: is like to the $\frac{1}{5}$, $\frac{1}{6}$, & $\frac{1}{7}$ of 2730. which is alſo 1391.

5. Find three numbers, whereof the $\frac{2}{5}$ of the firſt, the $\frac{3}{7}$ of the ſecond, and $\frac{4}{9}$ of the third, may be equall the one to the other. Anſwer. Set down the $\frac{2}{5}$, $\frac{3}{7}$, and $\frac{4}{9}$, and then multiply the Denominator of the $\frac{2}{5}$, that is to ſay 5 by the Numerators of the other two Fractions, that is to ſay, by the numerator of $\frac{3}{7}$, and by the numerator of $\frac{4}{9}$, which is 3 and 4, and thereof commeth 60 for your firſt number: then ſhall you multiply the Denominator of the $\frac{3}{7}$, which is 7 by the numerators of $\frac{2}{5}$ & $\frac{4}{9}$, that is to ſay, by 2 & 4, and thereof commeth 56, for the

second number. Then multiply the denominator of $\frac{4}{9}$, that is to say, 9 by the numerator of $\frac{2}{5}$ & $\frac{1}{7}$, that is by 2 & 3, and thereof cometh 54, for the third number. And thus the $\frac{2}{5}$ of 60, which is 24, is likewise the $\frac{2}{7}$ of 56, which is the second number, and is also the $\frac{4}{9}$ of 54, which is the third number.

6. Find three numbers, of which the first and the second may be in such proportion as $\frac{1}{2}$ & $\frac{1}{3}$, and the second & third in such proportion as $\frac{1}{4}$ & $\frac{1}{5}$. Answ. Reduce $\frac{1}{2}$ and $\frac{1}{3}$ cross-wise, and you shall have 3 over the $\frac{1}{2}$, and 2 over the $\frac{1}{3}$, then reduce $\frac{1}{4}$ and $\frac{1}{5}$ in like manner, and you shall find 5 over the $\frac{1}{4}$, and 4 over the $\frac{1}{5}$. Then say by the Rule of Three, if 5 doe give me 4, what shall 2 give me, which is the second proportionall, multiply the second number 4, by the third number 2, and thereof cometh 8, the which divide by the first number 5, and thereof cometh $1\frac{3}{5}$ for the third proportionall: & you shall find that 3, 2, $1\frac{3}{5}$, are the three numbers proportionall that I demand, or else 14, 10, & 8, in whole numbers.

Questions done by Addition in *Fractions*.

What number is that, unto the which if you adde 13 the whole amounteth to 31? Answer. Subtract 13 from

from 31, and there will remaine 18, which is the number you seek.

2. What number is that, unto the which if you adde $\frac{2}{3}$, the addition will be $\frac{1}{6}$? Answ. Abate $\frac{2}{3}$ from $\frac{1}{6}$, and there will remain $\frac{11}{30}$, which is the number that you desire.

3. What number is that, whereunto if you adde $7\frac{2}{3}$, the whole addition will be $12\frac{1}{4}$? Answ. Abate $7\frac{2}{3}$ from $12\frac{1}{4}$, and the remain will be $4\frac{7}{12}$, which is the number that you desire to know.

4. What number is that whereunto if you adde the $\frac{3}{7}$ of it self, that is to say, of the number that you seek, the whole addition may be $\frac{1}{6}$? Answ. Here followeth a generall rule for all such like Questions: First of 3, which is the numerator of $\frac{3}{4}$ make that still the numerator: and likewise of 3 and 4 added together, which is both the numerator, and the denominator, of the $\frac{3}{4}$, make them your denominator: so you shall find $\frac{3}{7}$: then take the $\frac{3}{7}$ of $\frac{1}{6}$ which is $\frac{3}{42}$ or $\frac{1}{14}$, and subtract them from $\frac{1}{6}$, and there will remain $\frac{10}{21}$, which is the number that you seek.

5. What number is that, unto the which if you adde his owne $\frac{2}{5}$ that is to say $\frac{2}{5}$ of it self, the whole addition shall be 20? Answ. Doe as in the last question, of the numerator

rator of $\frac{2}{3}$, that is to say of 2, make still your numerator: and likewise of the numerator 2 and the denominator 3 of the $\frac{2}{3}$ make of them both, your denominator: and you shall find $\frac{2}{5}$, then take the $\frac{2}{5}$ of 20 which are 8, & abate them from 20, and there will remain 12: which is the number that you desire. And so it is to be done of all such like reasons.

Questions done by Substraction in Fractions.

WHat number is that, from the which if you doe abate 17, the rest may be 19? Ans. Adde 17 & 19 together, & you shall find 37, which is the number that you seek.

2. What number is that, from the which if you abate $\frac{2}{5}$, the rest may be $\frac{1}{8}$? Ans. Adde $\frac{2}{5}$ & $\frac{1}{8}$ together, and you shall find $\frac{21}{40}$, which is the number that you demand.

3. What number is that, from the which if you reduct $13\frac{1}{2}$, the rest may be $5\frac{1}{7}$? Ans. Adde $13\frac{1}{2}$ & $5\frac{1}{7}$ together, & thereof cometh $19\frac{1}{14}$, which is the number that you seek.

4. What number is that, from the which if you substract his $\frac{2}{3}$, that is to say $\frac{2}{3}$ of it selfe, the rest may be 12? Answer. And a rule for such like reasons: that is to say, from the denominator of $\frac{2}{3}$ which is 3 abate 2 which

2 which is his numerator, and there reſteth 5 for the denominator, & thus of $\frac{2}{5}$ you have now made $\frac{2}{3}$, then take the $\frac{2}{3}$ of 12 which are 8, and adde them unto 12, and thereof commeth 20, for the number which you deſire.

5. What number is that, from the which if you do abate his $\frac{3}{4}$, the reſt may be $\frac{4}{9}$? Anſ. From the denominator of $\frac{3}{4}$, which is 4, ſubſtract his numerator 3 and there reſteth 1, thus of $\frac{3}{4}$ you have made $\frac{1}{1}$. Then multiply $\frac{1}{1}$ by $\frac{4}{9}$, and thereof cometh $2\frac{2}{3}$, the which adde unto $\frac{4}{9}$, and you ſhall have $3\frac{1}{9}$, which is the number that you ſeek.

6. What number is that from the which if you doe abate his $\frac{2}{5}$, the reſt may be $12\frac{2}{3}$? Anſw. Doe as you did in the laſt queſtion, and you ſhall find that the $\frac{2}{5}$ will be $\frac{2}{1}$: And therefore multiply $12\frac{2}{3}$ by $\frac{5}{1}$, and thereof commeth $50\frac{2}{3}$, the which adde unto $12\frac{2}{3}$, and you ſhall find $63\frac{1}{3}$, for the number that you demand. And thus of all ſuch like Queſtions.

Queſtions of Multiplication in Fractions.

What number is that, which being multiplied by 13, the whole product of that multiplication ſhall make 221? Anſwer. Divide 221 by 13, and thereof cometh

cometh 17, which is the number that you seek.

2. What number is that which being multiplied by 15 the whole multiplication will amount to $\frac{1}{4}$? Answ. Divide $\frac{1}{4}$ by $\frac{15}{1}$, and thereof cometh $\frac{1}{20}$, which is the number that you seek.

3. What number is that, which being multiplied by 21 the whole multiplication will be $16\frac{4}{5}$? Answ. Divide $16\frac{4}{5}$ by $\frac{21}{1}$, and you shall find $\frac{4}{5}$, and that is the number that you demand.

4. What number is that, which being multiplied by $\frac{3}{4}$, the multiplication will amount to 18? Answ. Divide $\frac{18}{1}$ by $\frac{3}{4}$, and thereof cometh 24 which is the number that you desire to know.

5. What number is that which if it be multiplied by $\frac{2}{3}$, the whole multiplication will be $\frac{1}{4}$? Answ. Divide $\frac{1}{4}$ by $\frac{2}{3}$, and the quotient will be $\frac{3}{8}$ which is the number that you require to know.

6. What number is that, which being multiplied by $\frac{2}{8}$, the product of the multiplication will be $16\frac{2}{3}$? Answ. Divide $16\frac{2}{3}$ by $\frac{2}{8}$, and thereof cometh $26\frac{2}{3}$, which is the number that you seek.

Here

Here enſueth other neceſſary Queſtions, which are wrought by Multiplication in broken numbers.

I Demand how much the $\frac{1}{8}$ of 20 s. are worth, or what are the $\frac{1}{8}$ of 20 s? Anſw. You muſt multiply $\frac{1}{8}$ by $\frac{20}{1}$, and the product will be $\frac{20}{8}$, therefore divide 100 by 8, and thereof cometh $12\frac{1}{2}$, which is to ſay, 12 s. 6 d. and ſo much are the $\frac{1}{8}$ of 20 s. worth.

2. I demand what the $\frac{1}{4}$ of $\frac{1}{5}$ of a pound of mony are worth? That is to ſay of 20 s. Anſw. Multiply $\frac{1}{4}$ by $\frac{1}{5}$, and thereof cometh $\frac{1}{8}$: Then take the $\frac{1}{8}$ of 20 s. as in the laſt Queſtion going before, and you ſhall find 12 s. 6 d. and ſo much are $\frac{1}{4}$ of $\frac{1}{5}$ of 20 s. worth.

3. I demand what the $\frac{1}{3}$ of 8 d. $\frac{1}{2}$ are worth? Anſw. Multiply 8 $\frac{1}{2}$ by $\frac{1}{3}$ or elſe $\frac{1}{3}$ by 8 $\frac{1}{2}$, which is all one, and you ſhall find $\frac{17}{6}$: Then divide 34 by 6, and your Quotient will be 5 d. $\frac{2}{3}$, and ſo much are the $\frac{1}{3}$ of 8 d. $\frac{1}{2}$ worth.

4. What are the $\frac{1}{4}$ of 14 d. $\frac{1}{5}$? Anſwer. Multiply 14 $\frac{1}{5}$ by $\frac{1}{4}$, and thereof cometh $\frac{219}{20}$: Therefore divide 219 by 20, and your Quotient will be 10 d. $\frac{19}{20}$: and ſo much are the $\frac{1}{4}$ of 14 $\frac{1}{5}$.

5. How

5. How many quarters or fourth parts are contained in $7\frac{3}{4}$? Answ. Multiply $7\frac{3}{4}$ by $\frac{4}{1}$ (because one whole containeth 4 quarters) and thereof cometh $30\frac{3}{4}$, and so many quarters are in the $7\frac{3}{4}$, that is to say, 30 quarters and $\frac{3}{4}$ of a quarter.

6. How many thirds are in $\frac{1}{4}$ and $\frac{1}{2}$, that is to say, in 3 quarters, and $\frac{1}{2}$ of one quarter or $\frac{1}{8}$? which are $\frac{7}{8}$ by the fift Reduction. Answ. Multiply $\frac{7}{8}$ by $\frac{1}{1}$ (for because that in 1 whole are contained 3 thirds) & thereof cometh $2\frac{1}{8}$, the which $2\frac{1}{8}$ doe signifie $\frac{2}{3}$, and $\frac{1}{8}$ of a third: and so many thirds are in $\frac{1}{4}$ & $\frac{1}{8}$ or in $\frac{7}{8}$, which is all one.

Questions done by Division in *broken numbers.*

1. What number is that, which being divided by 17, the quotient will be $13\frac{1}{2}$? Answer. Multiply 17 by $13\frac{1}{2}$, and thereof cometh 221, which is the number that you seeke.

2. What number is that, which being divided by $\frac{1}{4}$, the quotient will be 21? Ans. Multiply $\frac{21}{1}$ by $\frac{1}{4}$, and thereof commeth $\frac{63}{4}$: Then divide 63 by 4, and thereof commeth $15\frac{3}{4}$: which is the number that you seek.

3. What number is that, which being divided by $\frac{3}{8}$, the quotient will be $\frac{2}{3}$? Answ.

Multiply

Multiply $\frac{2}{3}$ by $\frac{1}{8}$, and thereof commeth $\frac{2}{24}$: which being abbrevied are $\frac{1}{12}$ for the number which you require.

4. What number is that, which being divided by $\frac{4}{5}$, the quotient will be $16\frac{2}{3}$? Answ. Multiply $16\frac{2}{3}$ by $\frac{4}{5}$, and thereof commeth $\frac{200}{15}$. Therefore divide 200 by 15, and thereof cometh $13\frac{1}{3}$, which is the number that you desire to find.

5. What number is that, which being divided by $13\frac{1}{3}$, the quotient will be 20? Answ. Multiply $\frac{20}{1}$ by $13\frac{1}{3}$, & thereof commeth $\frac{800}{3}$, then divide 80 by 3 and thereof commeth $266\frac{2}{3}$: for the number which you seek.

6. What number is that, which if it be divided by $12\frac{1}{2}$ the quotient will be $\frac{7}{8}$? Ans. Multiply $12\frac{1}{2}$ by $\frac{7}{8}$, and thereof cometh $\frac{175}{16}$: then divide 175 by 16, and thereof cometh $10\frac{15}{16}$: for the number which you desire.

Other necessary questions done by *Division in broken numbers.*

I Demand what part 30 is of 70? Answ. I divide 30 by 70, which you cannot, for they are $\frac{30}{70}$, but abbrevy them, and they are $\frac{3}{7}$: thus 30 are the $\frac{3}{7}$ of 70.

2. I demand what part 10 is of $16\frac{2}{5}$? Answ. Divide $\frac{10}{1}$ by $16\frac{2}{5}$, and thereof commeth

meth $\frac{10}{50}$, which being abbrevied are $\frac{1}{5}$. And thus 10 is found to be $\frac{1}{5}$ of 16 $\frac{2}{3}$.

3. Note, $\frac{1}{8}$ of one unit, what part are they of 25? Ans. Divide $\frac{1}{8}$ by $\frac{25}{1}$, and thereof cometh $\frac{1}{200}$, which being abbrevied is $\frac{1}{40}$, and thus $\frac{1}{8}$ of 1, is but the $\frac{1}{40}$ of 25.

4. Note, $\frac{1}{6}$ what part are they of $\frac{7}{8}$? Answ. Divide $\frac{1}{6}$ by $\frac{7}{8}$, and you shall find $\frac{42}{42}$ which abbrevied are $\frac{42}{21}$.

5. Note, $\frac{2}{5}$ of 1, what part are they of 13 $\frac{1}{3}$? Answ. Divide $\frac{2}{5}$ by 13 $\frac{1}{3}$, and you shall find $\frac{11}{200}$, which being abbrevied are $\frac{1}{50}$. And thus $\frac{2}{5}$ of 1, are the $\frac{1}{50}$ of 13 $\frac{1}{3}$.

6. Note, 12 $\frac{1}{2}$ what part are they of 30? Answ. Divide 12 $\frac{1}{2}$ by $\frac{30}{1}$, and you shall find $\frac{25}{60}$, which being abbrevied are $\frac{1}{12}$ and thus 12 $\frac{1}{2}$, are the $\frac{1}{12}$ of 30.

7. Note, 16 $\frac{2}{3}$ what part are they of 57 $\frac{1}{7}$? Answ. Divide 16 $\frac{2}{3}$ by 57 $\frac{1}{7}$, and thereof cometh $\frac{250}{1200}$ which being abbrevied are $\frac{7}{24}$: and thus 16 $\frac{2}{3}$ are the $\frac{7}{24}$ of $\frac{1}{7}$.

8. Note, $\frac{3}{4}$ & $\frac{2}{5}$ of $\frac{1}{4}$, or 3 quarters and $\frac{2}{5}$ of one quarter, what part are they of 1? Ans. reduce $\frac{1}{6}$ & the $\frac{2}{5}$ of $\frac{1}{4}$ into one broken number by the 5 reduction, and you shall find $\frac{11}{12}$. And thus the $\frac{1}{4}$, $\frac{2}{5}$ of $\frac{1}{4}$, are the $\frac{11}{12}$ of 1 whole.

9. Note, of what number are 9 the $\frac{2}{3}$? Ans. Divide 9 by $\frac{2}{3}$, and thereof cometh 13 $\frac{1}{2}$: which is the number whereof 9 are the $\frac{2}{3}$.

10 Note,

10. Speke, of what number are $\frac{2}{5}$ the $\frac{1}{4}$? Answ. Divide $\frac{2}{5}$ by $\frac{1}{40}$ and thereof commeth $\frac{8}{15}$: which is the number whereof $\frac{2}{5}$ are the $\frac{1}{4}$ of the same number.

11. Speke, of what number are $5\frac{1}{4}$ the $\frac{1}{7}$? Answ. Divide $5\frac{1}{4}$ by $\frac{1}{28}$, and you shall find $13\frac{2}{12}$, which is the number whereof $5\frac{1}{4}$ are the $\frac{1}{7}$.

12. Speke, $9\frac{2}{3}$, what part are they of $33\frac{1}{2}$? Answ. Divide $9\frac{2}{3}$ by $33\frac{1}{2}$, and thereof commeth $\frac{58}{201}$: and thus $9\frac{2}{3}$ are the $\frac{58}{201}$ of $33\frac{1}{2}$, as appeareth.

The Third part treateth of certaine brief Rules, called *Rules of Practise*, with divers necessary Questions: profitable not onely for *Merchants*, but also for all other Occupiers.

Chap. 1.

SOme there be, which doe call these Rules of Practise, briefe Rules: for that by them many Questions may be done with quicker expedition, than by the rule of Three. There be others which call them the small Multiplication, for because that the product is alwaies lesse in quantity than the number which is to be multiplied. This practise commeth not in use, but onely among small kinds of numbers, which have over them other numbers that are greater. And this being well considered, is no other thing but to convert lesser, and particular kinds of number, into greater: the which may be done by the meanes of division, in taking the halfe, the third, the fourth, the fift, or such other parts of the summe, which is to be multiplied, as the multiplier is part of his greater kind, and that which commeth thereof, is worth as much

much (not in quantity, but in his owne forme and quality) as if you did multiply simply the two fums, the one by the other. And for the better understanding of such number fums, you must have respect to one of these two considerations: The first is, when one should demand this Question, At 6 d. the yard of Cotten, what are 18 yards worth by the price? It is manifest that they are worth 18 pieces of 6 pence the piece, or 18 half shillings, which must be turned into shillings, in taking the half of 18 s. and they make 9 s: Or otherwise you must consider that at 1 s. the yard, the 18 yards are worth 18 s. Wherefore at 6 d. they shall be but halfe so much, for 6 d. is but the ½ of 1 s. Thereof you must take the ½ of 18 s. and they make 9 s. which are worth as much as 108 d. that is to say, 18 times 6 pence.

Rule.

First, if you will multiply any number after this manner by pence, whereof the number of the fame pence doe not extend unto 12, and thereof to bring shillings into the product: you must know the * aliquot parts of 12, which are these: that is to say, 6, 4, 3, 2, 1. For 6 is the ½ of 12, & 4 is the ⅓ of 12, 3 is the ¼, 2 is the ⅙, & 1 is the 1/12. When for 6 d. which is the half of 1 s.

* An aliquot part is an even part of a shilling, or a pound, of any other thing, as 1/2, 1/3, 1/4, 1/5, &c. are called aliquot parts.

you must take the $\frac{1}{2}$ of all the number which is to be multiplied: And that which commeth thereof shall be shillings: if there doe remaine 1, it is 6 pence.

For 4 pence, you must take the $\frac{1}{3}$ of all the number that is to be multiplied: and if any units do remain, they shall be thirds of a shilling, every one being in value 4 d.

For 3 pence, you must take the $\frac{1}{4}$ of all the summe: if any unites doe remaine they shall be fourths of a shilling, every one being worth 3 pence.

For 2 pence, you must take the $\frac{1}{5}$ of all the summe, and if any unites doe remaine they shall be fix parts of a shilling, being every one of them worth 2 pence.

For 1 peny, take the $\frac{1}{12}$ of the whole summe, if any unites doe remaine, they are the twelfth parts of a shilling, each of them being in value 1 d. as by these examples following doth plainly appeare.

Example I.

At 6 pence the yard.
What are 59 yards worth?

29 shil. 6 Pence.

For

II.

II.

At 4 Pence the yard,
What are 82 yards?

2 shil. 4. pence.

III.

At 3 Pence the yard,
What 96 yards?

24 shil. 3 pence.

IV.

At 2 pence the yard,
What 346 yards?

57 shil. 8 pence.

V.

At 1 peny the yard,
What 343 yards?

28 shil. 7 pence.

Here you may see in the first example, that 59 yards, at 6 d. the yard, are worth 29 s. 6 d. in taking the $\frac{1}{2}$ of 59.

And in the second example, the 82 yards at 4 d. the yard, are worth 27 s. 4 d. in taking the $\frac{1}{3}$ of 82.

And the wife in the third example, 97 yards, at 3 d. the yard bringeth 24 s. 3 d. in taking the $\frac{1}{4}$ of 97.

Also in the fourth example 346 yards, at 2 d. the yard, maketh 57 s. 8 d. in taking the $\frac{1}{6}$ of 346.

And finally, in the fift example, 343 yards, at 1 d. the yard, amount to 28 s. 7 d. in taking the $\frac{1}{12}$ of 343. And so is to be done of all such like, when the number of the pence is any of the aliquot parts of 12.

But if the number of the pence be not an aliquot part of 12, you must reduce them into some aliquot parts of 12: and after the aforesaid manner, you shall make of them two or three products as need shall require, and adde them together into one summe, as 5 d. may be reduced into 4 d. and 1 d. or else into 3 and 2 d. For 4 d. and 1 d. doe make 5 d. and so doe 3 d. and 2 d. the like. Wherefore if you will work by 4, & by 1: you must for 4 d. take first the $\frac{1}{3}$, of the number that is to be multiplied, and for 1 d. take the $\frac{1}{12}$ of whole summ, or rather for 1 d. ye may take the $\frac{1}{4}$ of the product which did come of the 4 d. because that 1 d. is the $\frac{1}{4}$ of 4 d. But if you will work by 3 d. and 2 d. you shall take for 3 d. the $\frac{1}{4}$ of the number which is to be multiplied: and likewise for 2 d. the $\frac{1}{6}$ of the same number, adding together both the products. The totall summe of those two numbers shall be

the

the solution to the question. And in like manner is to be done of all others.

As by these examples following may appeare:

Example I.

At 5 pence the yard,
What will 49 yard amount unto?

16 *shil.* 4 *pence.*
4 *shil.* 1 *d.*

20 *shil.* 5 *d.*

II.

At 7 d. the lib.
What will 54 lib. cost?

18 *shil.* 0 *d.*
13 *shil.* 6 *d.*

31 *shil.* 6 *d.*

III.

At 8 pence the piece,
What are 40 worth?

13 *shil.* 4 *d.*
13 *shil.* 4 *d.*

26 *shil.* 8 *d.*

Otherwayes.

At 8 pence the piece,
What are 40 pieces worth ?

20 *shil.*
6 *shil.* 8 *d.*

26 *shil.* 8 *d.*

IV.

At 9 pence the yard,
What are 73 yards ?

36 *shil.* 6 *d.*
18 *shil.* 3 *d.*

54 *shil.* 9 *d.*

V.

At 10 pence the Ell,
What are 32 Ells ?

16 *shil.* 0.
10 *shil.* 8 *d.*

26 *shil.* 8 *d.*

VI.

At 11 d. the lib.
What are 27 lib?

9 *shil.* 0.
9 *shil.* 0.
6 *shil.* 9.

24 *shil.* 9 *d*

Here

Here in this first example, where it is demanded (at 5 pence the yard) what will 49 yards amount unto? First for 4 d. I take the $\frac{1}{3}$ of 49 s. and thereof commeth 16 s. 4 d. then for 1 d. I take the $\frac{1}{4}$ of the same product, that is to say, of 16 s. 4 d. and that bringeth 4 s. 1 d. these two sums added together doe make 20 s. 5 d. And so much are the 49 yards worth at 5 the yard.

For 7 d. take the $\frac{1}{3}$ & the $\frac{1}{4}$ of the whole summe which is to be multiplied, and adde them together, that is to say, for 4 d. you must take $\frac{1}{3}$: and for 3 d. the $\frac{1}{4}$: because 4 d. is the $\frac{1}{3}$ of 12 d. and 3 d. is the $\frac{1}{4}$, as in the second example before both appeare, where the question is thus, at 7 d. the li. what will 54 li. cost? First for 4 d. I take the $\frac{1}{3}$ of 54 and they make 18 s. Likewise for 3 d. I take $\frac{1}{4}$ of 54, and they are 13 s. 6 d. Then I adde 18 s. and 13 s. 6 d. together, so both amount to 31 s. 6 d. and so much are the 54 li. at 7 d. the li.

Otherwise for 7 d. you shall take first the $\frac{1}{2}$ of the whole summe for 6 d. Then for 1 d. you must take the $\frac{1}{6}$ of the same product, and adde them together, so you shall have the like summe as before.

For 8 d. you must first take $\frac{1}{2}$ of the whole summe for 4 d: and another $\frac{1}{2}$ for

other

other 40. and adde them together, as in this example doth evidently appeare. Where the question is thus, at 8 d. the piece, what are 40 pieces worth? First for 4 d. I take the $\frac{1}{2}$ of 40 which is 13 s. 4 d. Againe, I take another $\frac{1}{2}$ for the other 4 d. which is also 13 s. and 4 d. These two summes being added together, doe make 29 s. 8 d. and so much are the 40 pieces worth, at 8 d. the piece: as in the third example aboveſaid doth appeare.

Otherwiſe for 8 d. you may take firſt the $\frac{1}{2}$ of the whole ſumme for 6 d. Then for 2 d. you ſhall take the $\frac{1}{3}$ of the product, which did come of the ſaid $\frac{1}{2}$, and adde them together: ſo ſhall you have likewiſe the ſolution to the queſtion. As in the ſame third example of 40 yards: I take firſt the $\frac{1}{2}$ of 40 for 6 d. and thereof commeth 20 s. then for 2 d. I take $\frac{1}{3}$ of the ſaid product, that is to ſay of 20 s. which bringeth 6 s. 8 d. theſe two ſummes (20 s. & 6 s. 8 d.) I adde together, and they make 26 s. 8 d. as before.

For 9 d. you muſt take the $\frac{1}{2}$, and the $\frac{1}{3}$ of the whole ſumme, and adde them together: or elſe for 6 d. take firſt $\frac{1}{2}$ of the whole ſumme, then for 3 d. take $\frac{1}{2}$ of the ſame product, becauſe 3 d. is the half of 6 d. And 6 d. added with 3 d. bringeth 9 d. as by the

fourth

fourth example where it is demanded after this sort, at 9 d. the yard, what are 73 yards worth? First for 6 d. I take the ½ of 73 & thereof commeth 36 s. 6 d. then for 3 d. I take ¼ of the same 36 s. 6 d. which is 18 s. 3 d. these two summes I adde together, & they make 54 s. 9 d. as in the said fourth example is evident.

For 10 d. take first the ½, then the ⅒ of the whole summe: and adde them together and it is done.

For 11 d. take first ½ for 4 d. secondly, another ⅓ for other 4 d. & thirdly, ¼ for 3 d. (of all the whole summe) & adde them together, and that answereth the question.

Or else for 11 d. take first the ½ for 6 d. then the ⅓ of the whole summe for 4 d. and finally, the ¼ of the last product for 1 d. adding them together, and it will be like to the other.

Likewise by the same reason, when you will multiply (by shillings) any number that is under 20 s. you shall have in the product pounds, if you know the aliquot parts of 20, which are these: 10, 5, 4, 2, & 1. For 10 is ½ of 20, 5 is the ¼ part, 4 is the ⅕, 2 is the $\frac{1}{10}$, and 1 is the $\frac{1}{20}$. *Rule 3*

When for 10 s. which is the ½ of a pound, you shall take the ½ of that number which is

to

to be multiplied, and you shall have pounds in the product. If there doe remaine 1, it shall be worth 10 s.

For 5 s. you must take the $\frac{1}{4}$ of the number which is to be multiplied, & if there do remain any units, they shal be fourth parts of a pound, every unit being in value 5 s.

For 4 s. you must take the $\frac{1}{5}$ of the number which is to be multiplied: And if there doe remaine any units, they shall be fift parts of a pound, every unit being worth 4 s.

Example.

At 10 shil. the piece,
What are 75 pieces worth?

37 lib. 10 shil.

At 5 shil. the yard,
What are 89 yards worth?

22 lib. 5 shil.

At 4 shil. the Ell,
What are 93 Ells worth?

18 lib. 12 shil.

For 2 s. you must take the $\frac{1}{10}$ of the number that is to be multiplied. All here-

fore

for if you will take the $\frac{1}{10}$ of any number, you must separate the last figure of the same number, (which is neareſt your right hand) from all the other figures, with a small strike or daſh with a pen. For all the other figures which doe remaine towards your left hand from the same figure that you doe separate, shall be the said $\frac{1}{10}$ of a pound: and that figure so separated toward your right hand, shall be so many pieces of 2 s. the piece, the which figure must be doubled to make thereof shillings; as by these examples appeareth.

At 2 shil. the lib.
What are 9|8 *lib. worth?*

9 lib. 16. shil.

At 2 shil. the dozen,
What are 40|3 *dozens worth?*

40 lib. 6 shil.

Hereupon dependeth another exact way, for to multiply by shillings (if the number of shillings be even) which is thus: you shall take $\frac{1}{2}$ the number of the same shillings, & convert them into pieces of 2 shillings. Then by the number of this helfe, you must first multiply the last figure, toward

ward your right hand) of the number which is to be multiplied. And if there be any tennes in the same product, those must you reserve in your mind: But (if with the same, or else without the same) you find any digit number, the same digit number shall you double, and put it into the place of shillings. Then must you proceed to the multiplication of the other figures, adding unto the product, the tennes which you before reserved: and thereof shall come pounds.

Now for your better understanding of this which hath been said, and by the way of example, I will propose unto you this question.

At 8 s. the gross, what are 97 grosse worth after the rate?

First in this example I take halfe the number of 8 as before is taught, that is to say, of 8 shillings which is 4 shillings: this 4 shillings I put apart behind a crooked line, right against 97 towards the left hand, as here you may see, and as hereafter appeareth by divers examples.

At 8 sh. the grosse,
4) *What will 97 grosse cost?*

38 lib. 16 sh.

At

At 6 shil. the yards,

3) *What 99?*

29 lib. 14 shil.

At 12 shil.

6) *What 345?*

207 lib. 0 shil.

At 14 shil.

7) *What 21 0?*

147 lib. 0 shil.

Now in the first example, where it is demanded at 8 s. the grosse, what are 97 grosse? First the ½ of 8 s. which is 4 s. being set apart behind the crooked line, as before is said: then I multiply the 97 by 4, saying first, 4 times 7 is 28. I double the digit number 8, and that maketh 16, the which 16, I doe put under the line, in the place of shillings, and I keep the 2 tennes in my mind, which here in work doe represent 2 li. Then secondly, I multiply 9 by the said 4, and thereof commeth 36 whereunto I adde the 2 li. which before I did reserve, and they make 38. Therefore I put 38. under the line in the place of pounds, & the whole sum will be 38 li. 16 s. Thus much are the 97 grosse worth, at 8 s. the grosse: the like is to be done of all other.

As

As of 12 s. in multiplying by 6. Likewise of 6 s. if you multiply by 3: also of 14. if you multiply by 7. And so of all such numbers after the same manner.

For 1 s. you must take the $\frac{1}{20}$ of the $\frac{1}{10}$ part of any number that is to be multiplied.

At 1 shil.

What 350?

17 lib. 10 sol.

And if any thing doth remaine they are shillings. Thus by this manner lyll. are converted into pounds: for it is even like as though you did divide them by 20 lyll. as by this example aboveſaid doth appear. Where it is demanded at 1 s. the peece, the piece or any other thing, what are 350 peeces or peeces worth.

First I separate the last figure of 350 next to my right hand, which is the 0, with a line between it and the figure 5: then I make a line under the 350, and I take the $\frac{1}{2}$ of 35, after this manner; saying the $\frac{1}{2}$ of 3 is 1, and 1 remaineth, which remain signifieth 10, in that second place: then I put 1 under the line against 3, and I proceed to the rest, saying the half of 15 is 7, (the which 15 came of the 1 that remained, and of the 5 in the first place.) I put 7 under

der the line, right against 5, and they make 17 li. The 1. which did last remain is 10 s. Now I put 10 s. apart under the line, and the whole summe is 17 li. 10 s. so much are 350 worth 1 s. the piece.

But when the number of shillings is not some aliquot part of 20 s. you must then convert the same number of shillings, into the aliquot parts of 20, and make two or three products as need shall require, the which must be added together after this manner following.

For 3 shillings, you must first take for 2 s. the $\frac{1}{10}$ of the number that is to be multiplied, then for 1 shilling, you must take the $\frac{1}{2}$ of the product which did come of the same $\frac{1}{10}$ part: and adde these two summes together, as appeareth by this example following.

At 3 s. the piece of any thing, what shall 684 pieces cost me after the rate? First, for 2 shillings I take the $\frac{1}{10}$ of 684, which is 68. in separating the last figure 4. which I must double, and they be 8; I set 8 s. apart from the place of pounds, and then I have 68 pounds 8 s. for the $\frac{1}{10}$ part, that is to say, for the 2 s. Secondly,

At 3 shil.	
What 684?	
6 lib. 8 shil.	
34 lib. 4 shil.	
102 li. 12 shil.	

to

for 1 s. I take the ½ of the product, that is to say, of 68 li. 8 s. which is 34 li. 4 s. and I put the same under the 68 li. 8 s. Then finally, I adde those two summes together, that is to say, 68 li. 8 s. & 34 li. 4 s. is they make 102 li. 12 s. and so much are the 684 pieces worth at 3 s. the piece, as may appeare in the precedent exemplar.

For 6 s. take ⅒ of the number which is to be multiplied, that is to say, take first ⅒ then double the product of the same ⅒, and adde them together. Or otherwise for 4 s. take first the ¼ of the number that is to be multiplied, then for 2 s. take ⅕ of the product, and adde them together.

Or else take for 5 s. the ¼ of the whole summe, then for 1 s. take the ⅕ of the product, and adde them together.

Likewise for 7 s. take first for 5 s. the ¼, then for 2 s. take the ⅕ of the number which is to multiplied, and adde them together.

For 8 s. take the ½ at two sundry times, that is to say, first ½ for 4 s. & then as much more for other 4 s. & adde them together.

For 9 s. take first the ½ and likewise the ⅓ of the number that is to be multiplied, and adde them together.

For 11 s. take first the ½ for 10 s. Then

for for

for 1 s. take the $\frac{1}{20}$ of the product, and adde them together, or else for 5 s. take the $\frac{1}{4}$: then for 4 s. take the $\frac{1}{5}$, and lastly for 2 s. take the $\frac{1}{10}$ of the last product, and adde them together.

For 12 s. take first the $\frac{1}{2}$ for 10 s. then for 2 s. take the $\frac{1}{5}$ part of the product, and adde them together.

For 13 s. take the $\frac{1}{2}$ then the $\frac{1}{5}$, and again another $\frac{1}{5}$ of the number which is to be multiplied, and adde the products together, that is to say, first for 5 s. take the $\frac{1}{4}$: then for 4 s take the $\frac{1}{5}$. And again another $\frac{1}{5}$ for the other 4 s. and adde the 3 products together. The like is to be done in all others, when the price of the thing which is valued, is oneip of shillings, as by these examples following both plainly appeare.

At 6 shill.

What 67?

13 *lib.* 8 *shill.*
6 14
20 *lib.* 2 *shill.*

At 7 shill.

What 347?

86 15
34 14
121 *lib.* 9 *shill.*

At 8 shil.
What 540?

108 lib. 0 shil.
108 0

216 lib. 0 shil.

At 9 shil.
What 230?

57 10
46 00

103 lib. 10 shil.

At 11 shil.
What 159?

79 10
7 19

87 lib. 9 shil.

At 12 shil.
What 349?

174 10
34 18

209 lib. 8 shil.

At 13 shil.
What 267?

66 15
53 8

173 lib. 11 shil.

Like-

Likewise in multiplying by pence, you shall have (at the first instant) pounds in the pound, in case you know the aliquot parts of the $\frac{1}{20}$ of a pound, or of 12 d. which are these, 12, 8, 6, 4, 3, and 2. For 12 is the $\frac{1}{20}$ of 1: 8 is the $\frac{1}{30}$: 6 is the $\frac{1}{40}$: 4 is the $\frac{1}{60}$: 3 is the $\frac{1}{80}$: and 2 is the $\frac{1}{120}$: but for 12 d. which is 1 s. I have before made mention thereof.

For 8 d. you must take the $\frac{1}{3}$ of the $\frac{1}{10}$ and the rest which are the pieces of 8 d. must be doubled to make of them pieces of 4 d. And of the same number being doubled, you must take the $\frac{1}{2}$ which will be shillings, and if there doe yet remain any thing, they are thirds of a shilling, being in value 4 d. the piece.

For 6 d. take the $\frac{1}{2}$ of the $\frac{1}{10}$, and of that remaineth, you must take the $\frac{1}{2}$ which shall be shillings: if there doe yet remaine 1, it shall be in value 6 d.

For 4 d. you must take the $\frac{1}{6}$ of the $\frac{1}{10}$ & of that which resteth take the $\frac{1}{2}$, to make thereof shillings: if any thing doe yet remaine, they are thirds of a shilling, being in value 4 pence the piece.

For 3 pence take the $\frac{1}{3}$ of the $\frac{1}{10}$, and of that remaineth, take the $\frac{1}{2}$ to make of them shillings: if any thing doe yet remaine,

they are fourthe of a shilling, every one of them being worth 3 d.

For 2 d. take the $\frac{1}{12}$ of the $\frac{1}{10}$ and of that which resteth, take $\frac{1}{2}$ the which are shillings, if there doe still remaine any thing, they shall be sixe parts of a shil. every one being in value 2 d.

For 1 d. you shall understand that it is not possible with ease to bring of d. pounds (into the product) upon the totall summe: But first you must bring them into shil. by the order of the second Rule of this Chap. & then afterward you shall convert them into pounds, if need so require, as by these examples following may appeare.

At 8 d.

What 39 6 ?

19 lib. 17 shil. 4 d.

At 6 d.

What 67 8 ?

16 lib. 19 shil.

At 4 d.

What 93 4 ?

15 lib. 11 shil 4 d.

At 8 d.

What 57 1 ?

At 2 d.
What 361 4 ?

3 lib. 0 shil. 8 d.

At 1 d.
What 676 ?

5 lib. 12 shil. 8 d.

2 lib. 16 shil. 4 d.

But if the number of pence, be not an aliquot part of 24 pence, then must you bring them into the aliquot parts of 24, and make thereof divers problems, which must be added together, as shall hereafter appeare.

For 5 d. you shall first take the 3 d. then for 2 d. and adde them together, according to the instruction of the last Rule. Or else, first take for 4 d. and then for 1 d.

For 7 d. first take for 4 d. then for 3 d. and adde them together.

For 9 d. take first for 6 d. then for 3 d. adding them together.

For 10 d. first take for 6 d. then for 4 d. and adde them together.

For 11 d. take first for 8 d. then for 3 d. & adde them together: as by these examples following both appeare.

At 5 d.

What 92 7 ?

11	11	9
7	14	6

19 lib. 6 ſhil. 3 d.

At 7 d.

What 51 2 ?

8	10	8
6	8	0

14 lib. 18 ſhil. 8 d.

At 9 d.

What 54 6 ?

13	13	0
6	16	6

28 lib. 9 ſhil. 6 d.

At 10 d.

What 27 3 ?

6	16	6
4	11	0

11 lib. 7 ſhil. 6 d.

At 11 d.

What 26 4 ?

8	16	0
3	6	0

12 lib. 2 ſhil. 3 d.

Rule 6. If you will multiply any number by ſhillings,

lings and pence being both together, you must take first for the s. according to the instruction of the third Rule of this first Chapter, then take for the d. after the order of the fift Rule before mentioned: but if there be any aliquot parts of 1 li. containing both shillings pence, then for those parts you shall take such like part of the number that is to be multiplied as the number is part of 1 li. the which aliquot parts are these, 6 s. 8 d. 3 s. 4 d. 2 s. 6 d. 1 s. 8 d. for 6 s. 8 d. is the $\frac{1}{3}$ of a li. 3 s. 4 d. is the $\frac{1}{6}$ of a li. 2 s. 6 d. is the $\frac{1}{8}$: and 1 s. 8 d. is the $\frac{1}{12}$ of a li. or 20 s. And therefore for 6 s. 8 d. you must take the $\frac{1}{3}$ of the number that is to be multiplied: and if any thing doe remaine, they are thirds of a li. every one being worth 6 s. 8 d.

For 3 s. 4 d. you must take the $\frac{1}{6}$ of the number which is to be multiplied, and if any thing doe remaine, they are sixt parts of a li. every one being in value 3 s. 4 d.

For 2 s. 6 d. you must take the $\frac{1}{8}$: if any thing be remaining they are 8 parts of a li. each one being worth 2 s. 6 d.

For 1 s. 8 d. you shall take the $\frac{1}{12}$ of the number that is to be multiplied, & if there be any thing remain they are twelve parts of a li. every one being in value 1 s. 8 d.

At

At 6 shil. 8 d.
What 647?

215 lib. 13 shil. 4 d.

At 3 shil. 4 d.
What 220?

36 lib. 13 shil. 4 d.

At 2 shil. 6 d.
What 47?

5 lib. 17 shil. 6 d.

At 1 shil. 8 d.
What 400?

33 lib. 6 shil. 8 d.

Rule 7. Here shall you accustome your selfe to multiply by all sorts of sums, being composed of shillings, and pence, which may come in use or practise. As thus, for 1 s. 1 d. for 1 s. 2 d: 1 s. 3: for 1 s. 4 d: Likewise for 2 s. 1 d. 2 s. 2 d. 2 s. 3 d. 2 s. 4 d. And so of all other, considering moreover, many subtile abbreviations, which happen oftentimes, that are easie to be conceived. As thus 11 s. 3 d. after that I have taken first the $\frac{1}{4}$ for 10 s. Then for 1 s. 3 d. I take the $\frac{1}{3}$ of the product, because 1 s. 3 d. is the $\frac{1}{3}$ of 10 s. in taking the said $\frac{1}{3}$ of the product. And by this meanes, when ye have taken one product, ye may oftentimes upon the same

same take another more briefly then upon the summe that is to be multiplied, which thing you must foresee.

At 11 shil. 3 d.
What 53?

26	10	0
3	6	3

29 lib. 16 shil. 3 d.

At 6 shil. 3 d.
What 58?

14	10	0
3	12	6

18 lib. 2 shil. 6 d.

At 12 shil. 8 d.
What 64?

32	0	8
6	8	0
2	2	8

40 lib. 10 shil. 8 d.

But if you will multiply by pounds, shillings, and pence, being all together; first you must wholly multiply by pounds; then take for the shillings and pence, as in the first Rule of this Chapter is plainly declared. And as by examples following may appeare.

At

At 3 lib. 6 shil. 8 d.
What 49?

147	0	0
16	6	8
163 lib.	6 shil.	8 d.

At 5 lib. 18 shil. 4 d.
What 543?

2715	0	0
271	10	0
135	15	0
90	10	0
3212 lib.	15 shil.	0 d.

At 2 lib. 7 shil. 4 d.
What 927?

1854	0	0
185	8	0
154	10	0
2193 lib.	18 shil.	0 d.

Rule 9. So these rules doe serve both to buy and sell. As at such a price the ell, the yard, the piece, the pound weight, or any other thing: how, with it such a thing, or so many ells worth. Otherwise they are very necessary to convert all pieces of gold and silver into pounds: for I may as well say, at 4 s 8 d. the French crowne, what are 135 crownes

grosses both? as to say at 4 s. 8 d. the yard of cloth, what are 135 yards worth?

Rule 10. When any one of the sums which is to be multiplied, is compoſed of many denominations; and the other being of one figure alone; then shall ye multiply all the denominations of the other summe by the same one figure, beginning first with that sum which is least in value towards your hand, and bring the product of those pence into shillings, and the product of the shillings into pounds, as by this example doth appeare.

At 3 lib. 9 shil. 8 d. the piece,
What 7?

24 lib. 7 shil. 8 d.

But (if any of the numbers which are to be multiplied) there be with it a broken number, you must (according to his denominator) take one or many parts of the other number, as need doth require, and set the number which cometh thereof under the products, casting the same together. As thus: At 5 li. 7 s. 9 d. the gross, what shall 34 gross cost? first you shall multiply 5 li. 7 s. 8 d. by 34 gross, saying 5 times 34 doe make 170 li. Then for 6 s. 8 d.

8 d. take the ½ of 34. which is 11 li. 6 s. 8 d. thirdly for ¼ s. take 34 s. which is 1 li. 14 s. Thirdly, for the ½ grosse, you must take ½ of the 5 li. 7 s. 8 d. which is 2 li. 13 s. 10 d. And then adde your 4 products together, so you shall find, that the 34 grosse ½ at 5 li. 7 s. 8 d. the grosse is worth 185 li. 14 s. 6 d. as appeareth in the example following.

At 5 lib. 7 shil. 8 d.
What 34 ½?

170 li.	0 shil.	0 d.
11	6	8
1	14	0
2	13	10
185 lib.	14 shil.	6 d.

And as in the last example, you did for the ½ grosse, take half of the price (that one grosse was worth) and therefore because 1 grosse is worth 5 li. 7 s. 8 d. the ½ grosse must be worth half so much. So likewise if you have ⅓ of a grosse, or of any other thing, you must take the ⅓ of the price, that one grosse is worth. And in like manner for the ¼ of any thing, you shall take the ¼ of the price, also if you have ⅔, take the ⅔ of the price that one is worth, and so of all other fractions, as by these examples following doth appeare.

At

At 4 lib. 6. shil. 8 d.
What 46 $\frac{1}{2}$?

184	0	0
15	6	8
2	3	4

201 lib. 10 shil. 0 d.

At 8 lib. 0 shil. 9 d.
What 54 $\frac{1}{3}$?

432	0	0
1	7	0
0	13	6
2	13	7

436 lib. 14 shil. 1 d.

At 3 lib. 16 shil. 8 d.
What 17 $\frac{1}{4}$?

51	0	0
8	10	0
5	13	4
1	18	4
0	19	2

68 lib. 00 shil. 10 d.

12. If you will make the proof of these rules aforesaid, you must first abate the summe of money (which the fraction of the multiplication doth import) from the total summe. And divide the rest of the pounds

of

of the said totall summe, by the whole multiplicand the fraction onely excepted. And if any thing doe remain after the division is made, that remain shall be multiplied by 20: and unto the product of that multiplication, you shall adde the shillings which remained of the rest of the totall summe. Againe, if any thing doe remaine after the same division, you must multiply the same by 12, and unto the product adde the pence of the totall sum that remained, if any be left. And thus if ye have truly wrought, you shall find againe the higher summe of your question, that is to say, the price that one grosse or any other thing is worth, whereof the question is demanded.

Or otherwise reduce the remaine of the totall summe (the value of the money that the fraction is worth being first reduced) all into pence, in multiplying the pounds by 20, and the shillings by 12: and adding thereunto the shillings and pence, which are joyned with the remain of the said totall summe if any such be, then divide those pence by the aforesaid number that is to be multiplied, the fractions of the same number being also shaled. You shall you find the price that one piece, one grosse, or any other thing is valued at; its in the first of the 3

last

last examples going before, where the totall summe is 201 li. 10 s. from the which I doe rebate the price of the half groſſe which is 2 li. 3 s. 4 d. the reſt is 199 li. 6 s. 8 d. which being reduced into pence bringeth 47840 d. I devide the ſame by 46, and thereof cometh 1040 d. Then I divide that 1040 d. by 12, and they bring 86 s. 8 d. that is to ſay, 4 li. 6 s. 8 d. which is the price that one groſſe, or any other thing did coſt as in that firſt example doth appeare.

The like is to be done of any manner of thing that is ſold by the hundred, after 5 score to the hundred.

As thus: at 12 li. 7 s. 6 d. the hundred pounds waight, what ſhall 374 pounds waight coſt? You ſhall firſt multiply 12 li. 7 s. 6 d. by 3: that is to ſay, by three hundred. Then for fifty pound waight you ſhall take the $\frac{1}{2}$ of 12 li. 7 s. 6 d. becauſe 50 li. is the $\frac{1}{2}$ of 100 li. Likewiſe for 20 pound waight which is the $\frac{1}{5}$ of 100 li. you ſhall take the $\frac{1}{5}$ of 12 l. 7 s. 6 d. Laſtly, for 4 pound waight you muſt take the $\frac{1}{5}$ of the laſt product. This done, you

Rule 13.

At 12 l. 7 s. 6 d.			
What 374?			
37	2	6	
6	3	9	
2	9	6	
0	9	10 $\frac{4}{5}$	
46 l.	5 s.	7 d. $\frac{4}{5}$	

you must adde all these products into one sum, which will make the sum of 461.58.7d. ½: as by the example before doth appear.

The proof is made by reducing the totall sum into d. And to divide the product by the number that is to be multiplied, that is to say, by 374, likewise divide the quotient produced of that first division by 12: so shall you find againe the higher sum 12 li. 7s.6d. which is the price of a 100l. waight, as before.

Also the like may be done of our usuall waight here in England (which is 112 li. for every 100 l. waight) in case you know the aliquot parts of a 100, that is to say of 112 li. waight, which are these, 56 l. 28 l. 14 l. & 7 l. For 56 li. is the $\frac{1}{2}$ of 112: 28 l. is the $\frac{1}{4}$ of 112 li. 14 li. is the $\frac{1}{8}$ and 7 li. is the $\frac{1}{16}$

Therefore for 56 l. take the $\frac{1}{2}$ of the sum of mony that the 112 li. waight is worth.

For 28 li. take the $\frac{1}{4}$ of the sum of mony that the 112 li. is worth.

For 14 li. take the $\frac{1}{8}$ of the sum that the C is worth.

For 7 li. take the $\frac{1}{16}$ of the sum of mony that the C. is worth.

As thus, at 3 li.6 s.8 d. the 100 l. waight, that is to say, the 112 l. what shall 24 hun-

dred

dred 3 quarters 21 l. waight cost after the rate?

First, you shall multiply 24 hundred by 3, which is the 3 li. and thereof will come 72 l. then for 6 s. 8 d. which is the $\frac{1}{3}$ of 10 s. you shall take the $\frac{1}{3}$ of 24, which is 8 li. for 24 nobles, maketh 8 l. afterward, for the 3 qu. of the C. you shall first for the 56 li take the $\frac{1}{2}$ of 3 li. 6 s. 8 d. because 56 li. is the $\frac{1}{2}$ of the C. and thereof cometh 1 l. 13 s. 4 d. then for 28 li. (which is the quarter of a C. you shall take the $\frac{1}{4}$ of 3 l. 6 s. 8 d. or else the $\frac{1}{2}$ of the product, which cometh last of 56 li. which is 16 s. 8 d. likewise for 14 li. you must take the $\frac{1}{8}$ of 3 l. 6 s. 8 d. which is 8 s. 4 d. or else the $\frac{1}{4}$ of the product that cometh of 28 l. which is all one. Finally for 7 l. take the $\frac{1}{16}$ of 3 l. 6 s. 8 d. or else the $\frac{1}{2}$ of the last product that cometh of 14 li. and thereof cometh 4 s. 2 d. Then adde all these products together: and the totall sum will be 83 l. 2 s. 6 d. so much are the 24 C. 3 qu. and 21 l. waight worth after 3 l. 6 s. 8 d. the C. as appeareth in the margent.

At 3 lib. 6 shil. 8 d.		
What 24 C. 3. qu. 21 li.		
72	0	0
8	0	0
1	13	4
	16	8
	8	4
	4	2
83 li. 2 shil. 6 d.		

The proof hereof is made, like to the other proofs aforesaid, saving that where in those proofs you abate the price of the money, that the fraction was worth, from the totall summe; here in this example (and in such other like) you must abate the price of the money, that the odde waight amounteth unto (over and above the just hundreds) from the totall summe; the rest thereof shall you convert into pence, dividing the product of the multiplication by the just number of the number of the hundreds, so shall you find the pence, that one hundred is worth: which you shall bring into pounds by the order of division, and so of all other.

Chap. 2.

Of the Rule of Three composed, the which is distinct into Foure Rules, each of them differing, the one from the other.

Here belongeth to the first & second parts of the Rule of Three composed alwaies 5 numbers: whereof (in the first part of the Rule of Three composed) the second number and the fift, are alwaies of one semblance and like

like denomination: whose rule is thus. You must multiply the first number by the second, and that shall be your divisor, then multiply the other three numbers the one by the other to be your dividend. Rule

Example of this first part, if 100 Crownes in 12 Months doe gaine 15 li. what will 60 Crowns gain in 8 Months? Answ. First multiply 100 Crowns by 12 months, and thereof cometh 1200 for your divisor, then multiply 15 li. by 60 crowns, and by 8 months, and you shall have 7200, wherefore divide 7200 by 1200, & thereof cometh 6 li. so many li. will 60 crowns gain in 8 months: this Question may be done by the double Rule of Three, that is to say, by the Rule of Three at two times. But yet this Rule of Three composed is more briefe.

Crowns.	*Months.*	*Pounds.*	*Crowns.*	*Months.*
— 100	12	15	60	8

2

7200

1200 6 *lib.*

2. In the second part of the Rule of Three composed, the 3. number is like unto the first, whereof the rule is thus, you must multiply the third number by the 4. & the product shall be your divisor, then multiply Rule 2.

the first number by the second, and the product thereof by the fift, the which number shall be your dividend, or number that is to be divided: as by example.

When 60 crowns in 8 months doe gain 6 l. in how many months will 100 crowns gaine 15 li? Answer. Multiply the third number 6 by the fourth number 100: and thereof cometh 600, which shall be your divisor: then multiply the first number 60 by the second number 8, and the product thereof by the fift number 15 and thereof will come 7200: then divide 7200, by 600, and the quotient will be 12, in so many months will 100 crowns gain 15 li. This question may likewise be done by the rule of 3, at 2 times.

Crowns.	Months.	Pounds.	Crowns.	Pounds.
60	8	6	100	15

x

7200 Months.

600 (12

In the third part of the Rule of Three composed there may be 5 numbers, or more: and in this rule the first number and the last are alwaies dissemblant and of unlike denomination, the one to the other: and the question

queſtion is from the laſt number unto the firſt, whereof the Rule is thus, You muſt multiply that number which you would know by thoſe numbers which do give the value, & divide the product of the ſame by the multiplication of the numbers which are already valued, as by example. If 4 deniers Pariſis be worth 5 deniers Tournois, & 10 deniers Tournois, be worth 12 deniers of Savoy, I demand how many deniers Pariſis are 8 deniers of Savoy worth? Anſ. Multiply 8 deniers of Savoy (which is the number that you would know) by 4 deniers Pariſis, and by 10 deniers Tournois which are the numbers that give the value, and they make 320: then multiply 5 deniers Tournois, by 12 deniers of Savoy which are the numbers already valued, and they make 60: Finally divide 320 by 60, and you ſhall find 5 deniers $\frac{1}{3}$ Pariſis, ſo much are the 8 deniers of Savoy worth. *Rule* 3.

Pariſis.	Tournois.	Tournois.	Savoy.	Savoy.
4d.	5d.	10d.	12d.	8d.

320 *par.*

60 (5d. $\frac{1}{3}$.

In the 4th part of the Rule of 3 compoſed: the firſt number & the laſt are always

semblant and of one denomination, and the question of this rule, is alwaies from the last number to that last saving one, where-
Rule 4. of there is a rule which is thus: You must multiply the number which you would know, by the numbers that are already valued, and divide the product of the same, by the multiplication which cometh of the numbers that give the value, as by example.

If 4 deniers Parisis, be worth 5 deniers Tournois, & 10 deniers Tournois, be worth 12 deniers of Savoy: I demand how many deniers of Savoy, are 15 deniers Parisis worth? Answ. Multiply 15 deniers Parisis that you would know, by 5 deniers Tournois, and by 12 deniers of Savoy, which are the numbers already valued, and they make 900. Divide the same by 4 times 10, which are the numbers that doe give the value, that is to say, by 40, and you shall find 22 deniers ½ of Savoy: so much are the 15 deniers Parisis worth.

Parisis.	*Tournois.*	*Tournois.*	*Savoy.*	*Parisis.*
4d.	5d.	10d.	12d.	15d.

12
00 | 0 Savoy.
44 | 0 22d. ½.

The

The third Chapter treateth of Questions of the trade of Merchandize, in the which is taught the Rule of Three in Fractions, beginning at the Question following.

IF 31 Devonsh. Dozens, doe cost me 100 li. 15 s. what shall 4 Dozens cost after the same rate? Answ. First bring the 100 li. 15 s. all into shil. in multiplying the 100 li. by 20, and adding to the product the 15 s. and thereof cometh 2015 s. then multiply 2015 by the third number 4, and divide the product by 31, and the quotient will be 260 s. The which divide again by 20, and thereof cometh 13 li. And so much are the 4 Dozens worth.

Dozens.	*Lib.*	*shil.*	*Dozens.*
31	100	15	4
	20		
	2015		
	4		
	8060		

1
28
8060 (260
3111
33

If 4 dozens be worth 13 li. what are 31 dozens worth by the price? Anſ. Multiply 31 by 13, and thereof cometh 403. The which you ſhall divide by 4, and thereof cometh 100 li. $\frac{3}{4}$, which $\frac{3}{4}$ are 15 s. and ſo much are 31 dozens worth, as before.

Dozens.	lib.	Dozens.
4	13	31
		13
		93
		31
		403
403		
444	(100 li. $\frac{3}{4}$	4

3. If 49 Elles be worth 2 li. 4 s. 11 d. what are 18 Elles worth by the price? Firſt you muſt bring 2 li. 4 s. 11 d. all into pence, in multiplying 2 li. by 20 maketh 40: adde thereto 4 ſhil. they make 44 ſhil. the which multiply by 12 d. and they make 528 d. whereunto adde 11 d. all is 539 d. the which 539 d. muſt be your ſecond number in the Rule of Three, then multiply 539 by the third number 18, and thereof cometh 9702, divide the ſame by 49, and you ſhall have in your quotient 198 d. the which divide by 12, and you ſhall finde

16

16 ſhil. 6 pence: ſo much are the 18 Elles worth.

Elles.	lib.	ſhil.	d.	Elles.
49	2	4	11	18
	20			539
	44			18
	12			4312
	88			539
	441			9702
	1			
	539			

13	1
427	76
536	198 (16 ſhil. 6 d.
9702 (198.	122
4999	1
44	

4. If 18 Elles be worth 16 s. 6 d. what are 49 Elles worth by the price? Anſwer. Bring 16 s. 6 d. into pence in multiplying 16 by 12, and thereof cometh 198 d. with the 6 d. added to it, then multiply 198 d. by 49, the product will be 9702. The which divide by 18 Elles, and thereof cometh 539 s. Then divide 539 by 12, and the product thereof by 20: So ſhall you have

2 li.

2li 4 s. 11 d. and so much are the 49 Elles worth.

Ells.	shil.	d.	Elles.
18	16	6	49
	12		198
	32		392
	166		441
	198		49
			9702

17		1	
446		151	
9702	(539	539	(44 shil.
1888		122	
21		7	

Note that whereas in the first part of this Book, I have set forth the Rule of Three both in whole numbers, and also in fractions: now I will shew you how to do the said Rule of Three in fractions more at large. And because I would have you to understand the same generally, you must first consider if the three numbers that shall be proponed (in any question of the said Rule of Three) be all fractions, yea, or no: which if they be all three numbers fractions, then must you worke as followeth.

First, you must multiply the Numera-

tors

tors of the second and third fractions in your Rule of Three, the one by the other, and again you must multiply that product by the denominator of the first fraction: and the number which cometh of this last multiplication, shall be your dividend, or number that must be divided.

Secondly, you must multiply likewise the Denominators of the second and third fractions in your said Rule of Three, the one by the other, and the off-come again by the numerator of the first fraction. And the number which is produced of that multiplication, shall be your divisor.

Thirdly, you must divide the aforesaid dividend by the divisor, and the quotient will be the answer to the question, as by Examples shall hereafter appear.

But if you find whole numbers and fractions together, in the said Rule of Three: you must first reduce the same into their fractions by the first Reduction.

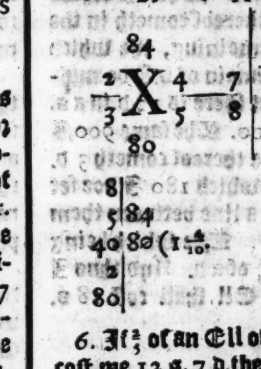
Likewise if you find any of the three numbers in your Rule of 3, to be whole numbers, alone without any fraction joyned with it, you must in this case put 1 under the same whole number with a line between them both: The which 1 doth represent the denominator to the same whole number,

number, and then you muſt proceed to worke the Rule of Three in like manner, as though they were all fractions: as before is ſaid.

The Examples of all three differences aforeſaid, doe follow in the Three next Queſtions orderly.

If $\frac{2}{3}$ X $\frac{4}{5}$ $\frac{7}{8}$: I do underſtand thereby thus as followeth: If $\frac{2}{3}$ of any waight, or meaſure be worth $\frac{4}{5}$ of 20 s. or of any other ſum, what are $\frac{7}{8}$ of the like waight or meaſure worth after the rate? Anſwer. Firſt, as is ſaid before, I doe multiply the Numerators of the ſecond & third fractions, the one by the other: that is to ſay, 7 by 4, and they make 28: again, I doe multiply the ſaid 28 by the Denominator of the firſt fraction, that is to ſay, by 3, and thereof cometh 84 the which 84, I ſet over the croſſe for my dividend. Secondly, I doe multiply the Denominators of the ſecond and third Fractions the one by the other: Namely 8 by 5, and they make 40: again I doe multiply the ſaid 40 by the Numerator of the firſt Fraction: that is to ſay, by 2, and thereof cometh 80, the ſame 80 I doe ſet under the croſſe for my Diviſor. Then I divide 84 by 80, and there cometh in

in the quotient 1 li. and $\frac{4}{10}$ remaining, the which $\frac{2}{10}$ being abbrevied, maketh $\frac{1}{5}$ of a pound, which is worth 12 d. And so much will the aforesaid $\frac{2}{5}$ cost, as by the worke following, doth appeare.



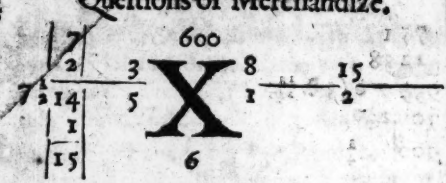
6. If $\frac{2}{5}$ of an Ell of any merchandize doe cost me 12 s. 7 d. the which 7 d. doth make $\frac{7}{12}$, what will $\frac{2}{10}$ of an Ell cost me after the same rate? Answer. First I set down my numbers as followeth. If $\frac{2}{5}$ X 12 $\frac{7}{12}$, $\frac{2}{10}$. Then by the 6 Reduction I reduce 12 $\frac{7}{12}$ all into Twelves, and they make $\frac{151}{12}$ for the second number in my Rule of 3, which must stand in the place of 12 $\frac{7}{12}$. And then will my three numbers stand thus as followeth, $\frac{2}{5}$ X $\frac{151}{12}$. $\frac{2}{10}$. Then I multiply 151 by 9, and the off-come by 5, and thereof cometh

cometh 6795, the which I doe set over the crosse for my dividend. Likewise I multiply 12 by 10, and the off-come by 2, and thereof cometh 240 which I doe set under the crosse for my divisor. Then I divide 6795, by 240: and thereof cometh in the quotient 28 s. & 75 remaining, the which 75 because it is the remain of s. I do multiply it by 12 d. for that there is 12 d. in a s. and thereof cometh 900. The same 900, I divide again by 240, & thereof cometh 3 d. and 180 remaining, which 180 I doe set apart over 240, with a line between them both, and they are $\frac{180}{240}$. The which being abbrevied, doe make $\frac{1}{4}$ of a d. And thus I find that the $\frac{2}{10}$ of an Ell shall cost 28 s. 3 d. $\frac{1}{4}$, as appeareth.

151	12		6795
	12		
17	24	2	X 151 9
32	127	5	12 10
32	151		240
151	12		3
9	10		297
2359	120		6795. (28 shil.
5	2		2400
6795	240		24

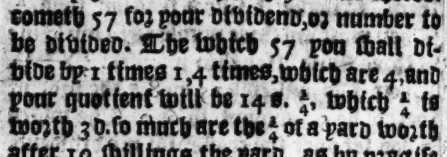
75 1
12 38
959 900 (3 d. 12/240
70 240
900 1/4

If 1/3 of an Ell doe coſt me 8 ſhillings, what will 7 Ells 1/2 coſt me after the rate? Anſwer. I doe firſt reduce the whole number and broken into his broken by the firſt Reduction, that is to ſay 7 1/2 into halfes, and they are 15/2, which muſt be the third number in my rule of three, the ſecond number is 8 ſhillings, but I muſt (as before is taught) put 1 under 8 with a line between them, to make it like a fraction thus, 8/1. Then muſt my three numbers in my Rule of three ſtand after this manner: 1/3 X 8/1 15/2. Then I doe multiply 15 by 8, & the product thereof by 5, amounteth 600. The which I doe ſet over the croſſe, for my dividend. Likewiſe I doe multiply 2 by 1, and the product thereof by 3, and thereof cometh 6, the which I do ſet under the croſſe for my diviſor. Then I divide 600 by 6, and I find in my quotient 100: the which is 100 ſhil. I do therefore divide 100 by 20 s. and my quotient is 5 li. And ſo much will the 7 Ells 1/2 coſt me, as hereafter doth appear.



15 2
8 1 600
120 2 666 (100 *shil.* 100 (5 *lib.*
20
5 3
600 6

If 1 yard of Velvet cost 19 shillings, what shall $\frac{1}{4}$ of a yard cost? Answer. Set down your numbers thus: If $\frac{1}{1}$ X $\frac{19}{1}$. Then multiply 1 times 19, by 3: and thereof cometh 57 for your dividend, or number to be divided. The which 57 you shall divide by 1 times 1, 4 times, which are 4, and your quotient will be 14 s. $\frac{1}{4}$, which $\frac{1}{4}$ is worth 3 d. so much are the $\frac{1}{4}$ of a yard worth after 19 shillings the yard, as by practise followeth.



Or otherwise by the rules of practise: first

first for $\frac{1}{4}$ of a yard which is $\frac{1}{2}$ of a yard, you must take the $\frac{1}{2}$ of 19 shillings, which is 9 s. 6 d. then for $\frac{1}{4}$ of a yard take the $\frac{1}{2}$ of the product, that is to say, of 9 s. 6 d. and thereof cometh 4 s. 9 d. adde these numbers together, and you shall have 14 s. 3 d. as above is said, and as appeareth here in the margent.

19 shil.	
9 shil.	6 d.
4	9
14	3

9 If $\frac{1}{2}$ of a yard of Velvet doe cost 14 s. 3 d. what shall 1 yard cost? Answer. Set your numbers down thus: If $\frac{1}{4}$ X 14 $\frac{1}{4}$ s. Reduce 14 $\frac{1}{4}$ into a fraction, and they will be $\frac{57}{4}$, then multiply 57 by 1, 4 times, and thereof cometh 228 for you dividend. Likewise multiply 1 times 4. 3 times, and thereof cometh 12 for your divisor: then divide 228 by 12, and your quotient will be 19 s. so much is the yard of Velvet worth.

Or otherwise by the Rule of practise: you shall take the $\frac{1}{3}$ part of 14 shillings 3 d.

which is 4s. 9 d. and adde it with the same 14 s. 3 d. and you shall have 19 shillings as before.

14 *shil.*	3 *d.*
4	9
19 *shil.*	0 *d.*

10 If one Ell of Holland cloth be worth 5 s. what are $\frac{2}{3}$ worth after the rate? Ans. Say thus, if $\frac{1}{1} \times \frac{5}{1}$ $\frac{2}{3}$. Then multiply 2 times 5, one time, and thereof cometh 10 for your dividend: likewise multiply 3 times 1, one time, they make 3 for your divisor, then divide 10 by 3, and thereof cometh 3 s. $\frac{1}{3}$, which $\frac{1}{3}$ is worth 4d. and so much are the $\frac{2}{3}$ of an Ell worth.

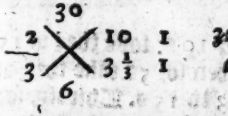
$$\frac{1}{1} \times \frac{5}{1} \quad \frac{2}{3} \quad \begin{array}{l|l} 1 & \\ \cancel{10} & (3\ \textit{shil.}\ \frac{2}{3} \\ \cancel{3} & \end{array}$$

Or otherwise, by the rule of practise: take first the $\frac{1}{3}$ of 5 s. for the $\frac{1}{3}$ of an Ell and that is 1s. 8d. likewise, for the other $\frac{1}{3}$ of an Ell, take again another $\frac{1}{3}$ of 5 s. which is also 1 shilling, 8 pence, and adde them together, and so shall you have 3 s. 4 d. as before.

5 *shil.*

5 ſhil.	
1	8
1	8
3 ſhil.	4 d.

11 If $\frac{2}{3}$ of an Ell of Holland cloth doe coſt me 3s.4d. what ſhall 1 Ell coſt? Anſ. Set down your numbers thus: $\frac{2}{3}$ X 3 $\frac{1}{3}$. 1. Firſt reduce 3 $\frac{1}{3}$ all into thirds, and it will be $\frac{10}{3}$. Then multiply 1 times 10, 3 times, and thereof cometh 30 for your dividend. Likewiſe multiply 1 times 3, 2 times, and your diviſor will be 6, then divide 30 by 6, and you ſhall have 5 ſhil. ſo much is the Ell of Holland cloth worth.



Or otherwiſe by practiſe, take the $\frac{1}{2}$ of 3s. 4d. which is 1 ſhilling 8 pence, and adde it to the ſame 3 ſhillings, 4 d. and thereof will come 5s. as before. For the $\frac{1}{3}$ of 5s. is as much as the $\frac{1}{2}$ of 3s.

4 d. which was the	3 ſhil.	4 d.
price that the $\frac{2}{3}$ of an	1	8
Ell did coſt, as appeareth.	5 ſhil.	0 d.

12 If one Ell cost me 17 s. what shall 15 Ells $\frac{1}{8}$ part cost? which $\frac{1}{8}$ is halfe a quarter of an Ell. Answer. Say if $\frac{1}{1}$ X $\frac{17}{1}$, $15\frac{1}{8}$. First reduce $15\frac{1}{8}$ into eight parts, and they make $\frac{121}{8}$ then multiply 121 by 17, 1 time, thereof cometh 2057, for your dividend. Likewise multiply 8 times 1, 1 time, and the product will be 8, for your divisor, then divide 2057 by 8, and you shall find 257 fht. $\frac{1}{8}$, which is 12 li. 17 s. 1 d. $\frac{1}{2}$, and so much are the 15 Ells $\frac{1}{8}$ worth, as by practise doth appear in the example following.

$$\frac{1}{1} \times \frac{17}{1} = \frac{2057}{8} \qquad \frac{121}{15\frac{1}{8}}$$

Or otherwise, for 10 s. take the $\frac{1}{2}$ of 15 which is 7 li. 10 s. then for 5 s. take the $\frac{1}{2}$ of 7 li. 10 s. which is 3 li. 15 s. Thirdly, for 2 s. take the $\frac{1}{5}$ of 7 l. 10 s. because the $\frac{1}{5}$ of 10 s. is 2 s. Fourthly, for the $\frac{1}{8}$ of the Ell, you shall take the $\frac{1}{8}$ of 17 shillings, which is

$15\frac{1}{8}$				
17				
2	7	10	0	
1 shilling 1 penny $\frac{1}{2}$.	3	15	0	
When adde all these	1	10	0	
sums together, and you		2	$1\frac{1}{2}$	
shall find 2 li. 17 s. 1 d. $\frac{1}{2}$.	12	li. 17	shil. 1	d. $\frac{1}{2}$.

as,

as before, and as appeareth more plainly in the former practiſe.

13 If 25 Elles be worth 2 li. 3 s. 4 d. what are 18 Elles $\frac{1}{4}$ worth by the price? Anſwer. Firſt put 3 s. 4 d. into the part of a li. and you ſhall have $\frac{1}{6}$: then ſay if $\frac{25}{1}$ give me 2 li. $\frac{1}{6}$, what ſhall $18\frac{1}{4}$ give? put the whole numbers 6 into their broken, and then multiply 1 times 13 by 75, the product will be 975, the which you ſhall divide by 25 times 6, 4 times: which maketh 600. Then divide 975 by 600: and your quotient will be 1 li. and 375 will remaine, the which 375 you ſhall multiply by 20, and thereof will come 7500. divide the ſame by 600, your quotient will be 12 s. and 300 will remain, the which abbreviated is $\frac{1}{2}$ which is 6 d: thus the 18 Ells $\frac{1}{4}$ are worth, 1 li. 12 s. 6 d. as by practiſe will appear.

$$\frac{13}{\frac{25}{1}} \times \frac{2\frac{1}{6}}{} \qquad \frac{75}{18\frac{1}{4}}$$

Or otherwiſe by the rules of practiſe, for becauſe that 12 Ells $\frac{1}{2}$ is the $\frac{1}{2}$ of 25 Ells, therefore take the $\frac{1}{2}$ of 2 li. 3 s. 4 d. which is 1 l. 1 s. 8 d. then for 6 Ells $\frac{1}{4}$ take the $\frac{1}{4}$ of 2 li. 3 s. 4 d. or elſe the $\frac{1}{4}$ of the laſt product, (that is to ſay, of 1 l. 1 s. 8 d.) which is all

one, and adde them together, ſo ſhall you have 1 li. 12 s. 6d. as before.

lib.	*ſhil.*	*d.*
2	3	4
1	1	8
	10	10

1 *lib.* 12 *ſhil.* 6 *d.*

14 If 15 yards be worth 32 s. what are half a yard and half a quarter, or elſe $\frac{3}{8}$ of a yard worth? Anſwer. Say if $\frac{15}{1}$ give $\frac{32}{1}$, what will $\frac{3}{8}$ give? Multiply 1 times 32 by 3, and divide the product by 15 times 8 times, and your quotient will be 1: and $\frac{48}{115}$ remaining, which is $\frac{1}{3}$ of a ſhilling, that is to ſay 4 d. and ſo much are the $\frac{3}{8}$ of a yard worth, that is to ſay 1 s. 4 d.

$$\frac{15}{1} \times \frac{32}{2\frac{1}{2}}$$

Or other wiſe, ſee what the yard is worth after the manner aforeſaid in the other examples, and you ſhall find that the yard is worth 2 s. 1 d. $\frac{2}{5}$: of the which number take firſt the $\frac{1}{2}$ for $\frac{2}{4}$, which is 1 s. 0 d $\frac{2}{5}$ of the which number, take the $\frac{1}{4}$ for the other $\frac{1}{8}$, which is 3 d. $\frac{2}{5}$, adde theſe two numbers together, and you ſhall find the $\frac{3}{8}$ to be worth 1 s. 4 d. as is before ſaid,

2 *ſhil.*

2 ſhil.	1 d.	$\frac{1}{5}$
1	0	$\frac{4}{5}$
	3	$\frac{1}{5}$
1 ſhil.	4 d.	0

15 IF 13 Ells $\frac{1}{6}$ be worth 27 ſhillings, what are 10 Ells $\frac{2}{3}$ worth by the price? Anſwer. Say if $13\frac{1}{6}$ give $\frac{27}{1}$ what ſhall $10\frac{2}{3}$ give? Put the whole numbers into their broken, & you ſhall find $\frac{21}{6}$ $\frac{27}{1}$ and $\frac{2}{3}$. Then multiply 6 times 27, by 32, and thereof cometh 5184, the which number you ſhall divide by 83 times, 1, 3 times, and you ſhall find 20 ſhillings $\frac{62}{83}$, which fraction is worth 8d. $\frac{62}{83}$ parts of a penny.

83	32
$13\frac{1}{6}$ X $\frac{27}{1}$	$10\frac{2}{3}$.

16 If 2 yards $\frac{1}{2}$ be worth 4 s. 8 d. what are 8 yards $\frac{1}{4}$ worth? Anſwer. Put the 8d. into the part of a ſhilling, ſetting 8 over 12 and it will be $\frac{8}{12}$ which abbrevied are $\frac{2}{3}$, then reduce whole numbers into 3 broken, and they will ſtand thus: $\frac{2}{3}$ $\frac{14+11}{4}$, then multiply 2 times 14 by 33, and divide the product by 5 times 3, 4 times: and you ſhall find 15 s. and $\frac{24}{60}$ will remaine which are worth 4 pence $\frac{4}{5}$, ſo much are the 8 yards $\frac{1}{4}$ worth.

5

5	14	33
$2\frac{1}{3}$	$4\frac{1}{3}$	$8\frac{1}{4}$

17 If 1 kersy be worth 2 li. 6 s. 8 d. how many kerseys shall I buy for 36 li. 3 s. 4 d. after the rate? Answer. Put 6 s. 8 d. into the part of a li. and you shall have 2 li. $\frac{1}{3}$, for the first number in the rule of 3, and 1 kersey for the second number: then put 3 s. 4 d. into the part of a li. and it is $\frac{1}{6}$, so you shall have 36 li. $\frac{1}{6}$ for the third number, then will your 3 numbers in the rule of 3 stand thus. $2\frac{1}{3}X\frac{1}{1}$. $36\frac{1}{6}$. Then reduce the whole numbers into their broken, and it will be thus $\frac{7}{3}X\frac{1}{1}$ $\frac{217}{6}$. Then multiply 3 times 1 by 217, and thereof will come 651 for your dividend. Likewise multiply 7 times 1 by 6: and the product thereof will be 42. Then divide 651 by 42, and you shall find 15 $\frac{1}{2}$. So many kersies of 2 li. 6 s. 8 d. the peece, shall you have for 36 li. 3 s. 4 d.

7	217
$2\frac{1}{3}X\frac{1}{1}$	$36\frac{1}{6}$

Of

Chap. 4.

Of losses and gaines in the trade of Merchandize.

1. IF 13 yards $\frac{1}{3}$ be worth 22 pound 10s. I pray how shall I sell 1 yard to gain $\frac{1}{3}$, or to make 3, 4? which is all one. Answ. Say by the rule of Three, if 3 doe yeeld 4, what will $22\frac{1}{2}$ yeeld? multiply and divide and you shall find 30 li. Then say again by the rule of 3, if 13 yards $\frac{1}{3}$ doe give 30 li. as well of principall as of gaine: what will 1 yard bee worth by the price? Multiply and divide, and you shall find 2 li. 5 s. and for that price must the yard be sold to gain the $\frac{1}{3}$, or to make of 3, 4.

180

45 | 180

$22\frac{1}{2}$ | 66 (30

6

90

40

$13\frac{1}{3} \times \frac{30}{1} \quad \frac{1}{1}$

40

Or otherwise, take the $\frac{1}{3}$ part of 22 li. 10 s. which is 7 li. 10 s. that shall you adde with 22 li. 10 s. and you shall

have

	li.	ſhil.
haue 30 li. as before.	22	10
30 by 13 1/3, and you	7	10
ſhall find 2 li. 5 s.	30	00

as aboue is ſaid.

2 If one yard be worth 27 s. 6 d. for how much ſhall 16 yards 2/3 bee ſold to gain 2 s. upon the li. of money? that is to ſay, upon 20 s? Anſwer. Adde 2 s. unto 20. and you ſhall haue 22, then ſay: If 20 s. principall do giue 22 s. principall and gain: how much will 27 s. 6 d. principall yeeld? Multiply and diuide, and you ſhall find 30 s. 1/4: then ſay again by the rule of 3. If 1 yard doe giue me 30 s. 1/4 (which is as well the principall as the gain) what ſhall 16 yards 2/3 giue me? Multiply and diuide, and you ſhall find 25 li. 4 s. 2 d. For the ſame price ſhall the 16 yards 2/3 be ſold to gain after the rate of 2 s. upon the pound of mony, or upon 20 s. which is all one.

55	121	50
20/1 X 22/1 27 1/2 | 1/1 X 30 1/4		16 2/3

3 If 10 yards 2/3 be worth 25 li. 10 s. for how much ſhall 2 yards 1/4 be ſold to gain after 10 l. upon the 100 li. of mony? Anſw. Say if 100 principall yeeld 110, as well principall as gain, how much will 25 li.

10

10 ſhillings yeeld me? Multiply and divide and you ſhall find 28li. 1s. Then ſay, if 10 yards $\frac{2}{3}$ do yeeld me 28 li. 1s. as well principall as gaine, how much ſhall 2 $\frac{1}{4}$ yeeld me? Multiply and divide and you ſhall find 5li. 18 s. 4d. $\frac{1}{12}$, and ſo much ſhall the 2 yards $\frac{1}{4}$ be ſold, to gain after 10 li. upon the 100 li. of mony.

			51
$\frac{100}{1}$ X	$\frac{112}{1}$.		25 $\frac{1}{2}$.
32	561		9
10 $\frac{2}{3}$ X	28 $\frac{1}{10}$	2	$\frac{1}{4}$.

And although that in theſe queſtions of gain and loſſe, ſometimes the firſt number is not like unto the third number, that is to ſay, of the ſame denomination, for wheras one would ſay, if 20 s. gain 2 s. what ſhall 50 li. gain? or what ſhall 2 5li. gain? &c. Or if 20li. doe gain 2li. what ſhall 15 s. gain? or what ſhall 27s. $\frac{1}{2}$ gain? Yet the ſame doth not prooue that the rule is therefore falſe. For if 20s. do gain 2 s. 20 li. ſhall gain 2 li. and 20 d. ſhall gaine 2 d. likewiſe 20 crowns, ſhall gain 2 crowns, and ſo of all other. Therefore it is to be underſtood, that the firſt number of the rule of three in theſe reaſons, is purpoſed

ſed to be ſemblable or like to the third in quality or name.

When one Merchant ſelleth wares to another, and he giveth to the buyer 2 upon 15: how much ſhall the buyer gain upon the 100, after the rate?

Anſw. Firſt adde 2 unto 15, and they are 17, then ſay, if 15 give 17, what ſhall 100 give? Multiply and divide and you ſhall find 113 $\frac{1}{3}$, ſo the buyer getteth after the rate of 13 $\frac{1}{3}$ upon the 100,

15 : | 17 : | 100.

4 If one Northern dozen coſt me 3 l. 5 s. I ſell the ſame again for 3 li. 12 s 6 d. how much do I gain upon the pound of mony after the rate? Anſwer. Say if 3 li. $\frac{1}{4}$ doe give 3 li. $\frac{1}{8}$ what ſhall $\frac{1}{7}$ give? put the whole number into their broken and you ſhall have $\frac{12}{4}$ X $\frac{25}{8}$ $\frac{20}{1}$, then multiply 4 times 29, by 20: and thereof cometh 2320: for your number that is to be divided: likewiſe multiply 13 times 8, 1 time, and thereof cometh 104. Then divide 2320, by 104 and you ſhall find 22 ſhillings, $\frac{8}{13}$. So I ſhall get 2 s. $\frac{8}{13}$ upon 20 s. or upon the pound of mony.

$$\frac{13 \quad 29}{3\frac{1}{4} \text{ X } 3\frac{1}{8} \quad \frac{20}{1}}$$

5 If

5 If a yard of cloth coſt me 7 s. 8 d. and afterward I ſell of the ſame cloth 13 yards $\frac{1}{4}$ for 4 li. 13 s. 4 d. I would know whether I do win or loſe, and how much upon the 100 li. of mony? Anſwer. See firſt at 7 s. 8 d. the yard what the 13 yards $\frac{1}{4}$ ſhal coſt, and you ſhall find 5 li. 1 s. 7 d. And I ſold the ſame but for 4 li. 13 s. 4 d. ſo that I do loſe upon the 13 yards $\frac{1}{4}$, the ſum of 8 s. 3 d. Then if you will know how much is loſt in the 100: Say by the rule of three, if 5 li. 1 s. 7 d. do loſe 8 s. 3 d. what will 100 li. loſe? Firſt, put 1 s. 7 d. into the part of a li. and it will be $\frac{19}{240}$. Likewiſe put 8 s. 3 d. into the part of a li. and it is $\frac{11}{80}$. Then will your numbers ſtand thus: $5\ \frac{19}{240} \times \frac{11}{80}\ \frac{100}{1}$, reduce the whole into his broken, and then multiply and divide, ſo you ſhall find 8 li. $\frac{1188}{9752}$ which fraction is worth 2 s. 5 d. $\frac{189}{1219}$, and ſo much is loſt in the 100 li. of mony.

$$\frac{1219}{5\ \frac{19}{140} \times \frac{11}{80}\ \frac{100}{1}}$$

6 More, If 12 yards $\frac{1}{2}$ of ſcarlet, be ſold for 30 li. 15 s. upon the which is gained after the rate of 11 $\frac{1}{9}$ upon the 100: I demand what the yard did coſt at the firſt? Anſ. from 30 li. 15 s. ſubſtract his $\frac{1}{10}$ part which is 3 li. 1 s. 6 d. and there reſteth 27 li. 13

s.

s. 6 d. the which number multiplyed by 2 bringeth 55 li. 7 s. of the which number take the $\frac{1}{5}$, which is 11 li. 1 s. and 4 d. $\frac{4}{5}$. Then take again the $\frac{1}{5}$ of the said 11 pound, 1 shilling 4 d. $\frac{4}{5}$, which is 2 li. 4 shillings 3 pence, $\frac{2}{25}$ and so much did the yard cost at the first penny.

30 *lib.*	15 *shil.*	0 *d.*
3	1	6
27	13	6
2	0	0
55	7	0
11	1	$4\frac{4}{5}$.
2 *lib.*	4 *shil.*	3 *d.* $\frac{2}{25}$

7 More, if 15 yards $\frac{1}{4}$ of scarlet, doe cost me 32 li. 13 s. 4 d. And I sell the yard again for 2 li. whether doe I winne or lose, & how much in or upon the pound of mony?

Answer. Look what the 15 yards $\frac{1}{4}$ are worth at 2 li. the yard, and you shall find that they are worth 31 li. 10 s. But they did cost 32 li. 13 s. 4 d. so that there is lost upon the whole, 1 li. 3 s. 4 d. Then to know how much is lost in the li. say by the rule of three, if 32 li. $\frac{1}{3}$ do lose 1 li. $\frac{1}{3}$, what will 1 lose? that is to say, what will 1 pound lose? reduce the whole numbers into their broken

and

and then multiply 1 and divide, ſo ſhall you find $\frac{21}{588}$ parts of a li. Then multiply 21 by 240 d. becauſe ſo many pence are in a li. and divide the product by 588, and you ſhall finde 8 d. $\frac{168}{588}$. which being abbreviated, doe make $\frac{2}{7}$, and thus you ſee, that 8 d. $\frac{2}{7}$, is loſt in the li. of money.

98 7

$32\frac{2}{7} \times 1\frac{1}{6}\ \frac{1}{1}$

8. If 1 yard of cloth of tiſſue, be ſold for 3 li. 15 s. whereupon is loſt after the rate of 10 d. in the 100: I demand what 12 yards $\frac{1}{2}$ of the ſame tiſſue did coſt? Anſw. Adde unto 3 li. 15 s. his own $\frac{1}{10}$ part, which is 7 s. 6 d. and all amounteth to 4 li. 2 s. 6 d. then look what the 12 yards $\frac{1}{2}$ will amount unto, after 4 l. 2 s. 6 d. and you ſhall finde that they will come to 51 l. 11 s. 3 d. ſo much did the 12 yards $\frac{1}{2}$ coſt.

	12 $\frac{1}{2}$
3 l. 15 ſh. 0 d	4 l. 2 ſh. 6 d.
7 6	48 00 0
4 l. 2 ſh. 6 d.	1 10 0
	2 01 3
	51 l. 11 ſh. 3 d.

9. Agayne, if I ſell one Wiltſhire white for 6 l. 12 s. whereupon I doe gaine after the rate of 2 s. upon the li. of money:

that is to say, upon 20 s. I demand what 11 pieces of the same whites did cost me? Answ. From 6 l. 12 s. (which is 132 s.) you shall subtract his $\frac{1}{11}$ part, that is to say, 12 s. and there will remaine 120 s or 6 l. Then see at 6 l. the cloth, what the 11 clothes are worth, and you shal find that they are worth 66 l. And so much did the 11 clothes cost.

132 shil.	11
12 shil.	6
120 shil.	66 li.

10. If I sell 10 ells $\frac{2}{3}$ of Holland for 22 s 9 d. whereupon I do lose after the rate of 2 s. in the li. of money, I demand what the ell did cost me? Answ. Say by the Rule of three, if 18 give 20 s. what will 22 s. 6 d. give? Multiply & divide, and you shall finde 25 s. Then divide 25 s. by $19\frac{1}{2}$: and thereof cometh 2 s. 4 d. $\frac{4}{7}$. So much did the ell cost.

$$\frac{11}{1} X \frac{22}{1}. \qquad 22\frac{1}{2}.$$

11. If I sell one cloth for 5 li. whereupon I doe lose after 10 in the 100. I demand how much I should lose or gaine, in the 100, if in case I had sold the same for 5 li. 10 s. Answer. Say if 90 yeeld 100 how much will 5 pound give? Multiply and divide, and you shall finde 5 pound $\frac{5}{9}$.

Then

Then say againe by the Rule of Three, if $5\frac{2}{9}$ come to $5\frac{11}{18}$, what will 100 come to? Multiply and divide, and you shall finde 99 li. which being substracted from a 100, there will remaine 1 l. and so much is lost in the 100.

Chap. 5.

Of lengths and bredths of Tapestry, and other Clothes.

1. IF a piece of Tapestry be 5 ells $\frac{1}{4}$ long, and 4 ells $\frac{2}{3}$ in bredth, how many ells square doth the same piece containe?

Answer. Multiply the length by the bredth, that is to say $5\frac{1}{4}$ by $4\frac{2}{3}$, and thereof will come 26 ells $\frac{1}{6}$, so many ells square doth the same piece containe.

2. More, if a piece of Tapestry doe contain 32 ells square, and the same being in length 6 ells $\frac{1}{4}$. I demand how many ells in bredth the same piece doth containe? Answ. Divide 32 ells by $6\frac{1}{4}$, and thereof cometh $5\frac{1}{25}$. So many ells doth the same piece containe in bredth.

3. More, a piece of cloth being 13 yards $\frac{1}{2}$ in length, and 5 quarters $\frac{1}{2}$ a quarter in bredth, how many yards of $\frac{2}{3}$ and $\frac{1}{3}$ of one third broad, will the same piece make? Ans. See first by the 5 Reduction what part of a yard the $\frac{1}{4}$ and $\frac{1}{8}$ quarter be, and you shall

finde that they make $\frac{13}{8}$, which is one yard $\frac{5}{8}$. Then multiply 13 yards $\frac{1}{3}$ by 1 yard $\frac{3}{8}$ you shall have 18 yards $\frac{7}{8}$ in square, the which you must divide by $\frac{3}{4}$ and $\frac{1}{2}$ being reduced into one fraction by the 5 Reduction: that is to say, by $\frac{1}{6}$ (because the $\frac{3}{4}$ and $\frac{1}{2}$ being brought into one fraction maketh $\frac{1}{6}$) and you shall finde 22 yards. So many yards of $\frac{3}{4}$ & $\frac{1}{2}$ broad doth the same piece contains.

4. More, a Merchant bought 4 yards $\frac{3}{4}$ of cloth, being six quarters and half one quarter broad, to make him a gowne, the which he will line throughout with black Say of $\frac{1}{4}$ of a yard broad. I demand how much Say ye must buy? Answ. Multiply the length of the cloth by the breath, that is to say, $4\frac{3}{4}$ by $1\frac{1}{8}$ (which is the 6 quarters $\frac{1}{2}$ a quarter) and thereof cometh 7 yards $\frac{7}{10}$, the which divide by $\frac{1}{4}$, and you shall find 10 yards $\frac{1}{9}$: so many yards of Say must be have to line the same 4 yards $\frac{3}{4}$ of cloth being of 6 quarters, and $\frac{1}{2}$ a quarter broad.

5. More, at 6 s. 8 d. the ell square what shall a piece of Tapestry cost me, which is 5 ells $\frac{1}{2}$ long, and 4 ells $\frac{1}{4}$ broad? Answer. Multiply $5\frac{1}{2}$ by $4\frac{1}{4}$, and thereof cometh 23 ells $\frac{1}{8}$ square: then say by the Rule of three, if 1 ell square cost me 6 s. 8 d. what shall $23\frac{1}{8}$ ells cost? Multiply and divide, and you shall finde 7 li. 15 s. 10 d. so much the said

said piece of Tapestry did cost.

Or otherwise by the Rules of practise, take the $\frac{1}{3}$ of $23\frac{1}{3}$: and you shall finde 7 li. 15 s. 10 d. as above is said.

6. More, a piece of Holland cloth containing 42 ells $\frac{2}{3}$ Flemmish, how many ells English doe they make? Here you must first note, that 100 ells Flemmish, do make but 60 ells English, and so consequently, 5 ells Flemish, doe make but 3 ells English. Therefore say by the Rule of 3, if 5 ells Flemmish doe make 3 ells English, how many English will 42 ells $\frac{2}{3}$ Flemmish make? Multiply and divide, and you shall find 25 ells $\frac{1}{5}$ English, & so many ells English doth 42 ells $\frac{2}{3}$ Flemmish contain: the like is to be done of all others.

7. More, I have bought a piece of Tapestry being 5 ells $\frac{1}{4}$ long, and 4 ells $\frac{3}{4}$ broad of Flanders measure. I demand how many ells square it maketh English measure? Answer. First, forasmuch as 3 ells English are worth 5 ells Flemmish, therefore put 3 ells English into his square, in multiplying 3 by it self which maketh 9: likewise multiply 5 in it self squarely, and it will be 25. Then multiply $5\frac{1}{4}$ which is the length of the piece by $4\frac{3}{4}$, which is the breadth, and thereof cometh 26 ells $\frac{1}{6}$ square, then say by the Rule of 3, if 25 ells

square of Flemmish measure be worth 9 elles square of English measure, what are 26 elle ½ Flemmish worth? Multiply and divide as you shall find that they are worth 9 elle 11/16 square of English measure.

8. More, at 3 s. 6 d. the ell Flemmish, what is the English ell worth after the rate? Answ. First, say if 5 elle Flemmish be worth 3 elle English, what is 1 ell Flemmish worth? multiply & divide, and you shall find ⅗ of an English ell. Then say again by the Rule of Three, if ⅗ of an English ell, be worth 3 s 6 d. what is 1 English ell worth? multiply & divide, and you shall find 5 s. 10 d. so much shall the English ell be worth.

9. More, at 6 s. 8 d. the Flemmish ell square, what is the English ell worth? Answ. Say by the aforesaid rule, if 25 elle Flemmish square, be worth 9 elle square English, what is 1 ell square Flemmish worth? Multiply and divide, and you shall find 9/25 of a square English ell. Then say, if 9/25 of an English ell be worth 6 s. 8 d. what is 1 square English ell worth? multiply & divide, and you shall find 18 s. 6 d. 2/9, so much shall 1 English ell square be worth.

Chap.

Chap. 6.

Of the reducing of the Pawnes of Genes into Engliſh yards.

Note that 100 *Pawnes doe make* 26 *Yards, and* 1 *Pawn is* $\frac{11}{50}$ *of a Yard after the ſame rate, and* 3 *Pawnes* $\frac{11}{13}$ *doe make* 1 *Yard.*

Example.

I Have bought 97 Pawns $\frac{1}{2}$ of Genes velvet, and I would know how many Yards they will make? Anſw. Say by the Rule of Three, if 100 pawns doe make 26 yards, what will 97 $\frac{1}{2}$ make? Multiply & divide, and you ſhall have 25 yards $\frac{7}{15}$. So many yards doe the 97 pawns $\frac{1}{2}$ containe.

Or otherwiſe take ſome other number at your pleaſure, as 25 pawns which doe make 6 yards $\frac{1}{2}$, and then ſay by the Rule of Three, if 25 pawnes doe make 6 yards $\frac{1}{2}$, what will 97 $\frac{1}{2}$ pawns make? Multiply & divide, and you ſhall finde 25 yards $\frac{7}{15}$ as before.

Now, at 2 s. 7 d. the pawne of Genes, what will the Engliſh yard be worth after the rate? Anſw. Say by the Rule of Three, if $\frac{11}{50}$ of an Engliſh yard be worth 2 s. $\frac{7}{12}$ What is $\frac{1}{2}$ yard worth? Multiply and divide, and you ſhall finde 9 s. 11 d. $\frac{2}{13}$. So

much is the Engliſh yard worth. Or otherwiſe multiply 100 pawnes which is 26 yards by 2 s. 7 d. and thereof cometh 258 s. 4 d. the which you muſt divide by 26 yards, and you ſhall finde 9 s. 11 d. $\frac{1}{13}$. as before.

3. If 257 pawns $\frac{1}{2}$ be worth 20 l. 16 s. 8 d. What is 1 Yard worth after the rate? Anſw. Say by the Rule of Three, if 257 $\frac{1}{2}$ pawns be worth 20 $\frac{1}{6}$, what are 3 pawnes $\frac{12}{13}$ worth? Multiply and divide, and you ſhall finde $\frac{1240}{4017}$ part of a pound, which is worth 6 s. 2 d. $\frac{324}{1339}$, and ſo much is 1 yard worth.

Chap. 7.

Of Merchandize ſold by weight.

1 A T 9 d. $\frac{1}{2}$ the ounce, what is the pound weight worth? Anſw. Say if $\frac{1}{1}$ give 9 $\frac{1}{2}$, what will $\frac{6}{1}$ give? Multiply & divide, and you ſhall find 12 s. 8 d. ſo much is the yard worth.

Or otherwiſe, by the Rules of Practiſe, for 6 d. take the $\frac{1}{2}$ of 16, which is 8 s. then for 3 d. take the $\frac{1}{4}$ of 16 s. which is 4 s. Finally, for the half pence, take 16 ob. which are 8 d. then adde all theſe numbers together and you ſhall finde 12 s. 8 d. as before.

2. More, at 10 $\frac{1}{2}$, the ounce: what are

112 l.

112 li. weight worth after the rate? Answ. Reduce 112 li. into ounces, in multiplying 112 li. by 16 ounces, and you shall have 1792 ounces: then say by the Rule of 3, if $\frac{1}{1}$ X $10\frac{1}{2}$. $\frac{1792}{1}$ multiply and divide, and you shall find 18816 d. which doe make 78 l 8 s. & so much are the 112 l. worth after 10 d. $\frac{1}{2}$ the ounce.

4. At 12 s. 8 d. the pound weight, what is the ounce worth? Answ. Put 12 s. 8 d. into pence, and you shall have 152 d. then say by the Rule of Three, if 16 ounces cost 152 d. what shall 1 ounce cost? multiply and divide, and you shall find 9 d. $\frac{1}{2}$ so much is the ounce worth.

Or otherwise, take the $\frac{1}{4}$ of 12 s. 8 d. for 4 ounces, and thereof cometh 3 s. 2 d. then for one ounce, take the $\frac{1}{4}$ of 3 s. 2 d. and you shall have 9 d. $\frac{1}{2}$ as before.

5. At 32 l 10 s. the quintal, that is to say, the 100 li. weight: what is 1 li. weight worth after the same rate? Answ. Put 32 l. 10 s. all into shil. and you shall have 650 s.

Then say by the Rule of Three, if 100 give 650, what will 1 give? Multiply and divide, and you shall finde 6 s. 6 d. so much is the li. worth.

6. If one pound of Saffron doe cost me 18 s. 8 d. what shall 355 l. 10 ounces cost me

me by the same price? Answer. Say by the Rule of Three, if $\frac{1}{1}$ X 18 $\frac{4}{3}$. 355 $\frac{5}{8}$. Multiply & divide, and you shall find 331 l. 18 s. 4 d. so much are the 355 li. 10 ounces worth.

Brief Rules of weight.

WHo that multiplieth the pence that 1 pound weight is worth, by 5. and divideth the product thereof by 12, he shall find how many pounds in money the quintall is worth, that is to say, how much the 100 pound weight is worth.

And contrariwise he that multiplieth the pounds of money that the 100 li. weight is worth by 12, and divideth the product by 5. shall find how many pence the Pound weight is worth.

Example.

At 17 d. the pound weight, what is the 100 pound weight worth?

Answ. Multiply 17 by 5, and thereof cometh 85, divide the same by 12, and you shall finde 7 li. $\frac{1}{12}$ in money, which $\frac{1}{12}$ is worth 1 s. 8 d. So much is 100 li. weight worth.

More, at 13 li. the 100 li. weight, what is 1 li. weight worth?

Answ. Multiply 13 by 12 and thereof cometh

cometh 156: the which divide by 5, and you shall find 31 d.$\frac{1}{5}$ which is 2 s. 7 d.$\frac{1}{5}$, and so much is one li. weight worth.

The like is to be done of yards, ells or of any other measure, when we reckon but 5 score to the C.

Brief Rules for Measure.

Who that multiplieth the pence that 1 ell is worth, by 2. and divideth the product by 4 he shall find how many pounds in money the 120 ells are worth, which 120 ells we count but for a hundred in this place, because of worke, which measure is used for Canvas onely.

Or otherwise, if you divide the pence, that 1 ell is worth, by 2: you shall have in your quotient the pounds that the said 120 ells are worth, and if any thing remaine, they are parts of a pound.

And contrariwise, he that multiplieth the pounds in money that the 120 ells are worth, by 4, and divideth the off-come by 2, shall finde how many pence the ell is worth.

Or otherwise, if you multiply the pounds that 120 ells are worth, by 2, you shall find in the product how many pence one ell is worth.

Example

Example.

At 10 d. the ell, what are 120 ells worth? Answ. Multiply 10 d. by 2, and thereof cometh 20. The which divide by 4, and you shall find 5 pound, so many pounds in money are 120 ells worth, at 10 d. the ell.

Or otherwise, divide 10 d. by 2, and thereof cometh into your quotient 5. which 5 doth represent 5 li. and so many pounds are the 120 ells worth, as before.

More, at 9 li. the 120 ells, what is 1 ell worth? Answer. Multiply 9 li. by 4, and thereof cometh 36, the which divide by 2, and you shall finde 18 d. so much is one ell worth.

Or otherwise, if you multiply 9 l. which is the price that the 120 ells are worth by 2, you shall have in the product 18, which 18 doth signifie the pence that 1 ell is worth when the 120 ells doe cost 9 li. as before.

The like is to be done of all manner of Wares, which are sold after 120 l. the Hundred.

Briefe

Brief Rules of our Hundreth weight here at LONDON, which is after 112 lib. for the C.

WHo that multiplieth the d. that 1 l. weight is worth by 7, and diuideth the product by 15 shall finde how many pounds in money the 112 li. weight is worth.

And contrariwise, he that multiplieth the pounds in money, that 112 li. is worth by 15, and diuideth the product by 7, shall find how many pence 1 l. weight is worth.

Example.

At 9 d. the pound weight, what is the 112 pound weight worth? Answ. Multiply 9 d. by 7, and thereof cometh 63, the which diuide by 15 and you shall finde 4 l. $\frac{1}{15}$, which being abbreuied is $\frac{1}{5}$ of a pound, being worth 4 s. And thus the 112 l. is worth 4 l. 4 s. after the rate of 9 d. the li.

At 8 l. the 112 li. weight, what is 1 li. weight worth? Answ. Multiply 8 l. by 15. and thereof cometh 120, the which diuide by 7 and you shall finde 17 d. $\frac{1}{7}$, so much is 1 l. weight worth when the 112 l. is worth 8 li.

Chap. 8.

Of Tares and allowances of Merchandize sold by weight.

1 AT 12 l. the 100 suttell, what shall 987 l. suttell be worth? In giving 4 pound weight upon every 100 for tret? Answer. Adde 4 li. unto 100 and you shall have 104. Then say by the Rule of Three, if 104. be worth 12 li. what are 987 pound waight worth? Multiply & divide, and you shall finde 113 l. $\frac{22}{26}$ which is worth 17 s. 8 d. $\frac{4}{13}$. So much shall the 987 l. weight be worth.

104. | 12. | 987.

2. At 6 s. 8 d. the li. weight, what shall 345 li. $\frac{1}{2}$, be worth in giving 4 li. weight upon every 100 for the tret? Answer. See first by the Rule of Three, what the 100 l. is worth, saying, If $\frac{1}{1}$ X 6. $\frac{2}{3}$. $\frac{120}{1}$. Multiply & divide, and you shall find 33 l. $\frac{1}{3}$, then adde 4 li. unto 100 and they are 104, then say againe by the Rule of Three, if 104 li. be sold for 33 li. $\frac{1}{3}$, for how much shall 345 l. $\frac{1}{2}$ be sold? Multiply and divide, and you shall finde 110 li. 14 shil. 8 d. $\frac{11}{83}$. For so much shall the 345 $\frac{1}{2}$ be sold, at 6 s. 8 d. the pound

pound in giving foure upon the hundred.

3. More, if 100 l. be worth 36 s. 8 d. what ſhall 780 l. be worth, in rebating 4 l. upon every 100, for tare and cloffe? Anſw. Multiply 780 by 4, and thereof cometh 3120. The which divide by 100, & you ſhall have 31 l. $\frac{1}{5}$: abate 31 $\frac{1}{5}$ from 780 and there will remaine 748 $\frac{4}{5}$. Then ſay by the Rule of 3, if $\frac{100}{1}$ do coſt 36 $\frac{2}{3}$. what will 748 $\frac{4}{5}$ coſt after the rate? Multiply and divide, ſo ſhall you find 274 s. 6 d. $\frac{12}{15}$, & ſo much ſhall the 780 l. coſt, in rebating 4 l. upon every 100. for tare and cloffe.

4. More, whether he doth loſe more that giveth 5 l. upon the 100, or he that rebateth 5 l. in the 100 for tare and cloffe? Anſwer. Firſt note, that he which giveth 5 l. upon the 100, giveth 105 for 100: and he which rebateth 5 l. in the 100, giveth the 100 for 95. Therefore ſay by the Rule of Three, if 105 be given for 100, for how much ſhal the 100 be given? Multiply and divide, and you ſhall finde 95 $\frac{5}{21}$, & he which rebateth 5 in the 100 maketh but 95 of a 100: ſo that he loſeth 5 in the 100, and the other which giveth 5 upon the 100, loſeth but 4 $\frac{16}{21}$ upon the 100. Thus you may ſee that he which rebateth 5 in the 100 loſeth more by $\frac{5}{21}$ in the 100, then the other which gave

5 upon the 100 for Tare and Cloſſe.

5. If 100 li. of Allom doe coſt me 26 s. 8 d. how ſhall I ſell the pound weight to gaine after the rate of 10 upon the 100? Anſwer. Put 26 ſhillings 8 pence all into pence, and you ſhall have 320 pence. Then ſay by the Rule of Three, if 100 give 110, what ſhall 320 give? Multiply 320 by 110 and divide the product by 100, and you ſhall find 352 pence. Then ſay againe, if 100 pound be worth 352 pence, what is 1 pound worth? Multiply and divide, and you ſhall have 3 d. $\frac{26}{50}$: which $\frac{26}{50}$ is worth $\frac{1}{2}$, and $\frac{1}{25}$ of $\frac{1}{2}$. That is to ſay, the pound weight ſhall be worth 3 d. $\frac{1}{2}$. $\frac{1}{25}$ of a half peny, in gaining 10 upon the 100.

6. If 1 pound weight doe coſt me 6 s. 10 d. and I ſell the ſame for 7 s. 2 d. I demand how much I ſhall gaine upon the 100 l. of money after the rate? Anſw. Say by the Rule of Three if 6 $\frac{1}{6}$ yeeld 7 $\frac{1}{6}$: what will $\frac{120}{1}$ yeeld? Put the whole numbers into their broken, then multiply & divide, and you ſhall finde 104 $\frac{16}{41}$, from the which ſubſtract 100, and there reſteth 4 l. $\frac{16}{41}$ ſo much is gained upon the 100 pound of money after the rate.

7. More, If 1 pound doe coſt me 5 s. 4 d. and I ſell the ſame againe for 4 s. 9 d. I demand

demand how much I ſhall loſe upon the 100 l. of mony? Anſw. Say, if $5\frac{1}{3}$, doe give but $4\frac{1}{4}$ what ſhall $\frac{100}{1}$ give? Put the whole number into their broken, then multiply and divide, and you ſhall finde $89\frac{1}{16}$, the which you muſt ſubſtract from a 100, and there will remaine 10 l. $\frac{15}{100}$ ſo much is loſt upon the 100 l. of mony.

8. More, if the pound weight doe coſt me 3 s. 2 d. and I ſell it againe for 4 s. 4 d. how much ſhall I gaine upon 20 s? Anſw. Say if $3\frac{1}{16}$ give $4\frac{1}{3}$, what ſhall $\frac{20}{1}$ give? multiply and divide, and you ſhall find 27 s. $\frac{7}{19}$, from the which abate 20 s. and there will remain 7 s. $\frac{7}{19}$, which is 4 d. $\frac{1}{19}$, and ſo much is gained upon the pound of mony, that is to ſay, upon 20 s.

9. If the pound weight doe coſt me 4 s. 4 d. and I ſell it againe for 3 s. 2 d. I demand how much I ſhall loſe in the pound of money? that is to ſay, in 20 s. Anſw. Say if $4\frac{1}{3}$ give but $3\frac{1}{6}$ what will $\frac{20}{1}$ give? multiply and divide, and you ſhall finde 14 s. $\frac{8}{13}$, the which you muſt abate from 20 s. and there will remaine 5 s. $\frac{1}{13}$, which $\frac{1}{13}$ is worth 4 d. $\frac{8}{13}$ of a peny, and ſo much is loſt upon the pound of mony.

Chap. 9.

Of certaine Questions, done by the double Rule, and also by the Rule of Three compo∫ed.

10 A Merchant hath ſold Wines for the ſum of 300 pounds, and he hath gained therein after 10 l. upon the 100 l. The queſtion is to know, how much he gained in all? Anſw. Say by the Rule of Three, if 100 l. doe gain 10 l. what will 300 l. gain? multiply and divide, and you ſhall find 27 l. $\frac{2}{11}$, and ſo much hath he gained in all.

11. A Merchant hath bought a piece of Hamſhire Carſey containing 18 yards, for the price of 4 l. 10 s. The queſtion is to know, how many yards he ſhall ſell for 33 s. 4 d. to gain 20 s. in the whole piece? Anſw. Adde 20 s. unto 4 l. 10 s. and they make 5 l. 10 s. Then ſay by the Rule of Three, if 5 l. $\frac{1}{2}$ doe yeeld me 18 yards, what will 1 l. $\frac{2}{3}$ yeeld? multiply and divide, and you ſhall finde 5 yards, $\frac{5}{11}$. And ſo many yards ſhall he ſell, to gaine 20 s. in the whole piece.

12. A Merchant hath ſold Sugars for the ſum of 600 l. ready money, and he hath gained

gained in the whole, the sum of 600 l. The question is, to know how much he hath gained upon the 100 li. Answ. First you must substract 60 li. from 600 li. and there will remaine 540 l. Then say by the Rule of Three, if 540 l. doe gaine 60 l. what will 100 l. gaine? multiply and divide, and you shall finde 11 l. $\frac{1}{9}$. And so much had he gained upon the 100 l.

13. Note, if 1 l. weight of maces doe cost me 5 s. 10 d. and afterward I doe sell the same for 6 s. the li. to be paid for, if at the end of 3 months: I demand how much I shall gain upon 100 l. in 12 months after the rate? Answ. Say by the first part of the Rule of Three composed: if 5 s. $\frac{1}{6}$ in $\frac{1}{1}$ months doe gaine $\frac{1}{6}$ of a shilling, which is 2 d. what $\frac{100}{1}$ l. gaine in $\frac{12}{1}$ months? multiply and divide, and you shall finde 11 l. $\frac{1}{9}$. And so much shall I gaine in 12 months after the rate.

14. Note, if 1 piece of Carsey doe cost me 35 s. for what price may I sell the same to be paid for, if at the end of 3 months, so that I may gaine thereby after the rate of 10 li. upon the 100 li. in 12 months? Answ. Say by the first part of the Rule of Three composed, if 100 pounds in 12 months doe gaine 10 li. what will 36 s. gaine in 3

months? multiply and divide, and you shall finde $\frac{1080}{1440}$ of a shil. the which being abbreviated, doth make $\frac{3}{10}$ of a shil. which is worth 10 d. $\frac{4}{5}$. the same you must adde with 36 s. and then you shall have 36 s. 10 d. $\frac{4}{5}$. And for that price, I must sell the piece of Kersey for to gain therein 10 l. upon the 100 l. in 12 months, and giving 3 months time for the payment.

15. More, if 6 yards of northern Carsey doe cost me 8 s. and I sell 4 yards of the same Carsey for 6 s. I demand whether I gain or lose, and how much upon a 100 l. of money? Answ. First you must seek what the 4 yards of Carsey did cost: saying by the Rule of Three, if 6 yards doe cost 8 s. what will 4 yards cost? multiply and divide, and you shall find 5 s. $\frac{1}{3}$, and so much did the said 4 yards cost, therefore abate the same 5 $\frac{1}{3}$ from 6 s. and there will remain $\frac{2}{3}$ of a s. which $\frac{2}{3}$ is gained in the same 4 yards of Carsey. Then say againe by the Rule of Three, if 5 $\frac{1}{3}$ doe gaine $\frac{2}{3}$: what will $\frac{100}{1}$ gaine? multiply and divide, and you shall finde 12 and $\frac{1}{16}$ which $\frac{1}{16}$ being abbreviated is $\frac{1}{2}$. Therefore it appeareth that I shall gain 12 l. $\frac{1}{2}$ upon the 100 l. in selling 4 yards of the said Carsey for 6 s.

16. More, a Merchant hath bought a piece,

piece of Damask which coſt him 8 s. the yard ready mony, and he ſelleth the ſame again to another Merchant, for 10 s. the yard, but he giveth two dayes for the payment, that is to ſay, 2 months for one half, and 5 months for the other half. The queſtion is to know, how much the ſaid firſt Merchant doth gaine upon 100 li. in 12 months after the rate aforeſaid? Anſwer. You muſt adde the 2 months and the 5 months both together, and they make 7 months, whereof you muſt take the one half, which is $3\frac{1}{2}$ months. And at that time, the ſecond Merchant ought to have paid the whole, at one entire payment, and therefore ſay by the firſt part of the Rule of Three compoſed. If $\frac{8}{1}$ in $3\frac{1}{2}$ months, doe gain $\frac{1}{1}$ s. what will $\frac{100}{1}$ gaine in $\frac{12}{1}$ months? multiply & divide, and you ſhall find 85 l. $\frac{1}{7}$. And ſo much doth the firſt Merchant gaine upon the 100 in 12 months.

17. A Merchant hath bought Velvet at 13 s. 9 d. the yard ready mony, and he ſelleth the ſame for 14 s. 3 d. the yard, to be paid $\frac{1}{3}$ part in ready mony, $\frac{1}{4}$ part at three months, and the reſt which is $\frac{5}{12}$, is to be paid to him at 5 months. The queſtion is, to know how much the firſt Merchant doth gaine upon the 100 li. in 12 months, after

the same rate? Answer. See first at what time all the payments ought to be paid at once: and for to know the same, you must multiply every severall payment, by the time it ought to be paid, and adde them together, then divide the product by the totall summe of all the payments being added together; And your quotient will shew at what time all the payments ought to be paid at once, as in the former example, $\frac{1}{3}$ part in ready money is not multiplied by any time, because it is paid presently, then $\frac{1}{4}$ part being multiplied by 3 months maketh $\frac{3}{4}$ of a month, and the rest being $\frac{5}{6}$ multiplied by 5 months bringeth $2\frac{1}{12}$, then adde $\frac{3}{4}$ & $2\frac{1}{12}$ together, and they make 2 months $\frac{5}{6}$, the which is the just time that all the payments ought to be paid at once. And therefore say by the first part of the Rule of 3 composed. If $13\frac{1}{2}$ in 2 months $\frac{5}{6}$ doe gaine $\frac{3}{4}$ of a pound, what will 100 l. gaine in 12 months after the rate? multiply and divide, and you shall finde 23 l. $\frac{9}{17}$. And so much doth he gaine upon the 100 li. in 12 months.

18. A Merchant hath bought Fustians which cost him 22 s. 6 d. the piece ready mony, and he will sell the same at 24 s. the piece. The question is to know what time

he ought to give for the payment of the same, to the end he may gaine after 9 l. upon the 100 l. in 12 months. Answer, Say if 22 $\frac{1}{2}$ doe gaine 1 $\frac{1}{2}$: what will $\frac{100}{1}$ gaine? multiply and divide, and you shall finde 6 $\frac{2}{3}$ of gaine. Then say againe by the Rule of Three, if $\frac{9}{1}$ of gaine doe require $\frac{12}{1}$ what will 6 $\frac{2}{3}$ of gaine require? multiply and divide, and you shall finde 8 $\frac{8}{9}$, which is 8 months and $\frac{8}{9}$, and so long time ought he to give, to gaine after the rate of 9 l upon the 100 l. in 12 months.

19. A Merchant hath bought a piece of Satten being in length 20 yards which did cost him 12 pounds and 10 s. ready money. I demand for what price he shall sell the yard, to be paid at the end of 2 months, so that he may gaine after the rate of 10 l. upon the 100 l. in 12 months? Answ. See first what the yard did cost him at the first, saying by the Rule of Three, if 20 yards cost 12 l. 10 s. what will 1 yard cost? multiply & divide, and you shall find 12 s. 6 d. Then say againe by the Rule of Three, if 12 months doe give me 10 l. what will 2 months give? multiply and divide, and you shall find 1 l. $\frac{2}{3}$. Adde therefore the said 1 $\frac{2}{3}$ unto 100 and they are 101 $\frac{2}{3}$. Say therefore once againe by the Rule of Three,

if $\frac{102}{1}$ doe give me 101 $\frac{2}{3}$ what will 12 give? multiply and divide, and you shall find 12 s. and $\frac{17}{24}$ which is worth 8 d. $\frac{1}{30}$ and for 12 s 8 d. $\frac{1}{2}$, must he sell the yard of Satten giving 2 months time for the payment to gain after the rate of 10 l. upon the 100 l. in 12 months.

20. Prob. if 1 l weight of Cinamon doe cost me 8 s. ready money, for what price shall I sell 100 l. weight of the same, to be paid the $\frac{1}{4}$ at 1 month, and the residue at the end of 3 months; so that I may gain after 9 li. upon the 100 li. in twelve months after the rate? Answer. Seek first in how long time, both the payments should bee made at once.

$\frac{1}{4}$.	1.	$\frac{1}{4}$.
$\frac{3}{4}$.	1.	$2\frac{3}{4}$.
		$2\frac{1}{2}$ month.

The which to doe, you must multiply each payment of money, by the time when it ought to be paid, that is to say, you must multiply the first payment which is $\frac{1}{4}$ part by 1 month, and thereof cometh $\frac{1}{4}$ of a month. Likewise you must multiply the next payment which is $\frac{3}{4}$ by 3 months, and thereof will come 2 months $\frac{1}{4}$. Then adde $\frac{1}{4}$ of a month, and 2 months $\frac{1}{4}$ both together, and they make 2 months $\frac{1}{2}$ which is the time that both the payments ought to be

paid

paid at once. Then ſay by the Rule of Three, if 12 months do give 9 l. what will 2 months $\frac{1}{2}$ give? multiply and divide, and you ſhall finde $1\frac{7}{8}$. Say again by the Rule of Three: If 1 l. weight doe coſt me 8 s. what will 100 l. coſt? multiply and divide, and you ſhall finde 40 l. Then ſay once againe, if $\frac{100}{1}$ doe give $101\frac{7}{8}$, what will $\frac{40}{1}$ give? multiply and divide, and you ſhall finde $40\frac{1}{4}$. And ſo for 40 l. 15 s. I muſt ſell 100 l. weight of Cinamon, to be paid at the 2 ſeverall times aforeſaid, to gaine therein after the rate of 9 l. upon the 100 l. in 12 months, as by example aforeſaid.

20. When the quarter of Wheat doth coſt 6 s. 8. the loaf of Bread weighing 20 ounces, is ſold for a half peny. I demand that if the quarter of Wheat did coſt ten ſhillings, for how much ſhall the loaf of Bread be ſold, that weigheth 16 ounces? you ſhall anſwer by the firſt part of the Rule of Three compoſed, which is mentioned in the ſecond Chapter of the third part of this Booke, where you muſt ſay by the ſame firſt part of the Rule of Three compoſed, if $6\frac{2}{3}|\frac{20}{1}|\frac{1}{2}|\frac{12}{1}|\frac{16}{1}$.

Then multiply the firſt number by the ſecond, and the product thereof ſhall be your Diviſors. Likewiſe multiply the other three

thzee numbers the one by the other, and the pzoduct thereof shall be your dividend: as thus, first multiply $6\frac{2}{3}$ by $\frac{12}{15}$, and thereof cometh $\frac{120}{45}$ for your diviſor, then multiply $\frac{1}{2}$ by $\frac{1}{3}$, and the pzoduct thereof by $\frac{1}{5}$, so you shall have $\frac{120}{2}$ for your number that is to be divided, then divide $\frac{120}{2}$ by $\frac{120}{3}$, and thereof cometh $\frac{360}{360}$, the which being abbzeviated bringeth $\frac{1}{2}$ of a peny: and for that pzice must the loafe of bzead be sold, which weigheth 16 ounces, when the quarter of wheat is wozth 16 shillings.

Or otherwise by the Rule of Three at two times. First say, if $\frac{12}{1}$ ounces give $\frac{1}{2}$, what will $\frac{16}{1}$ ounces give? multiply and divide, and you shall find $\frac{2}{3}$ of a peny. Then say againe, if $6\frac{2}{3}$ doe give me $\frac{2}{3}$, what will $\frac{12}{15}$ give? multiply and divide, and you shall find $\frac{2}{5}$ of a peny, as afoze is said.

21. When the carriage of one hundzed weight of merchandize 50 miles, doth cost 5 s. what shall the carriage of 500 weight cost me for 16 miles? Anſ. By the first part of the Rule of 3 compoled, saying, if 100 50 5 | 500 | 16. multiply 100 by 50, the pzoduct will be 5000, which shall be your diviſor: Then multiply 5 times 500 by 16, and thereof cometh 40000 for your dividend. Wherefore divide 40000 by 5000, and you

shall

shall finde 8 s. so much shall cost the carriage of 500 weight 16 miles.

Or otherwise by the double Rule of 3, that is to say, by the Rule of Three at two times: first say, if 50 miles doe pay 5 s. what shall 16 miles pay? multiply and divide, and you shall finde 1 s. $\frac{1}{2}$. Then say againe, if 100 weight doe cost me 1 s. $\frac{1}{2}$, what shall 500 weight cost? multiply and divide, and you shall finde 8 s. as before.

22. When the carriage of 100 pound weight of merchandize 84 miles doth cost me 6 s. how many miles may I have 64 pound weight carried for 3 s. 4 d? Answer, by the second part of the Rule of Three composed, and say if $\frac{100}{1}|\frac{84}{1}|\frac{6}{1}|\frac{64}{10}|3\frac{1}{3}$. Then multiply the fourth number $\frac{64}{10}$ by the third number $\frac{6}{1}$ and thereof cometh $\frac{384}{10}$ for your divisor. Likewise multiply $3\frac{1}{3}$ by $\frac{100}{1}$, and by $\frac{84}{1}$, and you shal have in the product $\frac{28000}{3}$, then divide $\frac{28000}{3}$ by $\frac{384}{10}$, and you shall finde 72 miles, and $\frac{11}{12}$ of a mile. So many miles shall the 64 pound weight be carried for 3 s. 4 d.

Otherwise by the Rule of Three, at two times: First, say if 100 weight doe cost me 6 d. what will 94 pound weight cost? multiply & divide, and you shall finde 3 s. $\frac{21}{25}$. Then say if 3 $\frac{21}{25}$ bee paid for 94 miles carriage:

carriage: for how many miles shall 3 s. $\frac{1}{3}$ be paid? multiply and divide, and you shall find 72 miles $\frac{11}{12}$, as before.

23. If 100 Horses, in 100 Dales, doe spend 180 Quarters of Oats: how many Quarters of Oats will 350 Horses spend in 150 Dales? Answer. By the first part of the Rule of Three composed you must multiply 180 times 350, by 150: and divide the product by 100 times 100: and you shall finde 945 Quarters. So many Quarters of Oats will 350 Horses spend, in 150 Dales. Or otherwise by the Rule of Three at two times. First say, if 100 dales doe yeeld me 180 quarters of Oats: what shall 150 dales yeeld? multiply and divide, and you shall finde 270 quarters: then say againe, if 100 Horses doe spend 270 quarters of oats, how many quarters of oats will 350 Horses spend? multiply and divide, and you shall finde 945 quarters, as before.

Chap. 10.

Of the Rules of Fellowship, without any time limited.

THe Rule of Fellowship is thus, you must set down each mans sum of money that he layeth into company, every one directly under the other, the which sums you shall adde all together, and the totall sum of all their whole stocks being thus assembled shall be your common divisor, to the finding out of every mans part of the gain. Then you shal multiply either the gain, or else the losse, which soever of them doe happen, by each mans portion of money that he laid in, and divide the products by the said divisor: so shall you have in your quotient every mans part of the gaine, if any thing be gained, or else of the losse if any thing be lost.

Example.

1. Two Merchants have laid their money in company together: The first laid in 500 l. The second laid in 300 l. and with trading they have gained 64 l. I demand, how much each man shall have of the same gaines according to the money that he laid in? Answer. Adde 500 and 300 both together,

ther, which are the parcels or summes that they both laid in, and thereof cometh 800 for your divisor: then say by the Rule of Three, if 800 li. which is the whole stock doo gaine 64 li. what shall 500 li. gaine? (which is the first mans money that he laid in) multiply and divide, and you shall finde 40 li. for the first mans part of the gaine: then say, if 800 give 64. what doth 300 give? multiply and divide, and you shall finde 24 li. for the second mans part of the gaine.

500			
300	800	64	500.
800			
	800	64	300.

Or otherwise, put 500 li. which is the first mans money that he laid in, over the 800 li. which is the whole stock, and you shall have $\frac{500}{800}$, which being abbrevied, doe make $\frac{5}{8}$ and such part of the gaine shall the first man take, that is to say $\frac{5}{8}$ of 64. which is 40 li. And consequently, by the same manner, the second shall take the $\frac{3}{8}$ of 64, which is 24 pound, for his part of his gaine, as before.

5|00 | 3|00

8|00 | 8|00

2. Two Merchants have companied together, the first laid in 640 l. and he taketh ⅝ parts of the gaine, I demand how much the second Merchant laid in? Answering that the first Merchant taketh ⅝ of the gaine, it followes that the second Merchant must have ⅜ which in the rule and theorick lay by the Rule of Three, if ⅝ of the gaine which the first man taketh, did lay into the stock 40 l. How much shall ⅜ of the gaine lay in, which is the second mans gaine? multiply and divide, and you shall finde 384 l. so much ought the second man to lay into company.

3. Two Merchants have companied together, the first man layes in 640 l. and the second hath laid in so much money for his part, that he must have 60 l. for his part of 100 l. that they have gained. I demand how much the second man did lay into company? Answ. Seeing that the second man taketh 60 l. of the gaine, it followeth that the first must have the rest of the 100 l. which is but 40 pound. Therefore say by the Rules of Three, if 40 l. doe lay in 60 l. what shall 60 l. lay in? multiply and divide,

vide and you shall finde 960 li. so much did the second Merchant lay in.

4. Two Merchants have companied together, The first laid in 83 li. 6 s. 8 d. The second laid in 170 Duckets, and they have gained 100 li. of the which the first man must have 60 li. I demand what the Ducket was worth. Answ. Seeing that the first man must have 60 l. it followeth that the second must have 40 li. Therefore say by the Rule of Three, if 60 li. of gaine that the first man taketh, did lay in 83 li 6 s. 8 d. principall, how much shall 40 li gaine put in, which is the gaine that the second man taketh? multiply and divide, and you shall find 55 l. $\frac{5}{9}$, so much are the 170 Duckets worth. Then put 55 l. $\frac{5}{9}$ into shillings, and you shall have 1111 s. $\frac{1}{9}$. So then for to know what the Ducket is worth, say by the Rule of Three, if the $\frac{170}{1}$ give 1111 $\frac{1}{9}$, what will $\frac{1}{1}$ give? multiply and divide, and you shall finde 6 s. 6 $\frac{33}{51}$, so much is the Ducket worth.

5. Two Merchants having companied together, the second man laid in more by 30 l. then did the first man, and they gained 120 l. of the which the first man ought to have 50 l. I demand what each of them did lay in? Answer. From 120 li. abate

50 l.

50 l. and there resteth 70 l. for the second mans part: so that by this meanes the second man (because he laid in 30 li. more than the first man did) he taketh 20 l. more of the gaine: and therefore say by the Rule of Three, if 20 l. gaine did lay in 30 l. principall, how much shall 50 l. gaine lay in? multiply and divide, and you shall find 75 l. so much did the first man lay in, and consequently the second laid in 105 l.

6. Two Merchants have companied together, the 2d. hath laid in twice so much as the first man did, and 10 l. more: and they have gained a 100 l. of the which, the first ought to have 32 l. for his part: I demand how much each of them did lay into company? Answ. If it were not for the 10 li. that the second man laid in more than the first, he should have had but 64 l. of the gaine, which is the double of the first mans part. But because he laid in 10 li. more, he hath therefore 4 l. more of the gaine, and therefore say by the Rule of Three, if 4 l. gaine did lay in 10 li. of principall (which was over and above the double of the first mans layings in) what shall 32 li. of gaines lay in, which is the first mans part of the gaines that he taketh? multiply and divide, and you shall find 80 li. for the first

mans laying in: and so consequently 170 l. for the second mans portion that he laid in.

7. Two Merchants have companied together, and they have gained 100 pound, of the which the first must have after the rate of 10 li. upon the 100 l. and the second must have after the rate of 15 li. upon the 100 li. I demand how much each of them ought to have? Answ. Put 10 l. for the first mans laying in, and 15 li. for the second mans laying in. Adde therefore 10 li. and 15 li. together, and they make 25 li. Then put 10 over 25, and it is $\frac{10}{25}$ which being abbreviated are $\frac{2}{5}$. Therefore he that taketh 10 l. upon the 100 l. must have the $\frac{2}{5}$ of the gain, which is 40 l. Then put 15 over 25, and it is $\frac{15}{25}$ which being abbreviated are $\frac{3}{5}$: Therefore the second must have $\frac{3}{5}$ of the 100 li. which is 60 li.

8. Two Merchants have companied together. The first laid in 46 l. 18 s. and the second laid in 33 l. 2 s. so they have gained 30 li. I demand how much every man shall have for his part of the gaine? Answ. Adde 46 pound 18 shil. and 33 li. 2 s. both together, and you shall finde 80 li. for your common divisor: then say if 80 li. which is all their stock doe gaine 30 l. what will 46 $\frac{9}{10}$ gaine? which is the money that the

first

first man laid in? multiply and divide, and you shall finde 17 l. 11 s. 9 d. for the first mans part of the gaine. Then say againe by the Rule of Three, if 80 l. doe gaine 30 l. what will 33 l. $\frac{1}{10}$ gaine, which was the second mans money that he laid in? multiply and divide, and you shall finde 12 l. 8 s. 3 d. for the second mans part of the gaine.

And after the same manner shall you doe, in case that they were 3 or 4 Merchants that would company together. Adding all and every of their sums of money (which they lay into the stock) into one totall sum, which shall be your common divisor: and then work with the rest, as is taught in the former question of the Rule of Company.

Example.

9. Three Merchants have companied together, the first laid in I know not how much: the second did put in 20 pieces of cloth: and the third laid in 500 l. So at the end of their company, their gaines amounted unto 1100 l. whereof the first man ought to have 350 l. and the second must have 400 l.

Now I demand, how much the first man did lay in, and for how much the 20 pieces of cloth were put into company.

Answer. Seeing that the first, and the second Merchants must have 750 pound for their part of the gaine; Then the third man must have the rest of the 1000 pound, which is 250 pound. And therefore say by the Rule of Three, if 250 pound gaine, be come of 500 pound principall, of how much shall come 350 pound gaine, which the first man taketh? multiply and divide, and you shall finde 700 pound. So much did the first man lay in: then say if 250 pound gaine, become of 500 pound principall, of how much will come 400 pound, which is the gaine that the second man taketh? multiply and divide, and you shall finde 800 pound. For that price were the twenty pieces of Cloth laid into company.

10. Three Merchants have gained 100 pound: The first must have the $\frac{1}{2}$. The second must have the $\frac{1}{3}$. And the third must have the $\frac{1}{4}$. I demand how much every man must have of the gaine? Answer. Reduce $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$, into a common denomination, after the order of the second Reduction in Fractions, and you shall finde $\frac{12}{24}$, for the $\frac{1}{2}$, $\frac{8}{24}$ for the $\frac{1}{3}$, and $\frac{6}{24}$ for the $\frac{1}{4}$: Then take 12 for the first mans laying in, 8 for the second mans laying in, and 6 for the third mans laying in. The which three

three numbers being added together, ſhall be your common diviſor, and they doe make 26. Then multiply 100 l. by 12, for the firſt man: then againe 100 l. by 8 for the ſecond: and laſt of all 100 l. by 6 for the third man. And divide the products of every multiplication by 26. So ſhall you find 46 l. $\frac{8}{13}$ for the firſt mans part of the gaine: 30 l. $\frac{10}{13}$ for the ſecond mans part: and 23 l. $\frac{1}{13}$ for the third mans part.

11. Two Merchants have gained 100 pound. The firſt muſt have $\frac{1}{2}$ and 5 pound more, the ſecond muſt have $\frac{1}{3}$ and 4 l. more, I demand how much each of them ſhall have? Anſwer. Firſt, from 100 abate 5 and 4, which are 9, ſo there will remaine 91, then take the $\frac{1}{2}$ of 100 li. which is 50 li. for the firſt mans laying in. Likewiſe, take $\frac{1}{3}$ of 100 li. for the ſecond mans laying in, which is 33 l. $\frac{1}{3}$: Then adde 50 l. and 33 l. $\frac{1}{3}$ together, and you ſhall have 83 l. $\frac{1}{3}$ for your common diviſor: then multiply 91 l. by 50, and divide by 83 $\frac{1}{3}$, and thereof commeth 54 l. $\frac{1}{7}$, unto the which number adde 5, and all is 58 l. $\frac{1}{7}$ for the firſt mans part of the gaine. Likewiſe multiply 91 by 33 $\frac{1}{3}$, and divide by 83 $\frac{1}{3}$ and you ſhall find 36 l. $\frac{1}{7}$, unto the which adde 4, and you ſhall have 40 l. $\frac{1}{7}$ for the ſecond mans part.

12. Two Merchants have gained 100 l. The first must have the $\frac{1}{3}$ lesse by 4 l. The second must have $\frac{1}{3}$ lesse by 2 l. I demand how much each of them shall have? Answ. Adde 4 and 2 with 100, and they make 106. Then take as before is said, 50 l. for the first man: and 33 $\frac{1}{3}$ for the second, and adde them both together, and they be 83 $\frac{1}{3}$, which shall be your divisor. Then multiply 106 by 50, and divide the product by 83 l. $\frac{1}{3}$, so thereof cometh 63 l. $\frac{1}{5}$. From the which abate the 4 l. lesse that the first man taketh, and then is there remaining 52 l. $\frac{1}{5}$ for his part. Likewise multiply 106 by 33 $\frac{1}{3}$, and divide by 83 $\frac{1}{3}$, and you shall finde 42 l. $\frac{2}{3}$, from the which abate 2 li. lesse, and there remaineth 40 li. $\frac{2}{3}$ for the second mans part.

The Rule of Fellowship, with time.

The money that every man layeth in, must be multiplied by the time that it continueth in company: and of that which cometh thereof, you shall make their new layings in for each of them: and then multiply the gaines by every one of them severally, and the offcomes you shall divide by all their new layings in added together, and then you shall have proportionally each

mans part of the gaine according to his laying in.

Example.

1. Two Merchants have companied together, The first hath put in the 1 of January, 450 li. The second did lay the 1 of May, 750 li. And at the yeares end, they had gained 100 li. I demand how much each of them shall have of the gaine? Answer. For as much as the first did put 450 li. the 1 of January, his money continued in company 12 months, and therefore multiply 450 by 12 months, and thereof cometh 5400 for his new laying in. And the second laid in his 750 l. but at the 1 day of May: so that his money remained in company but 8 months. Therefore multiply his 750 l. by 8 and thereof cometh 6000 for his new laying in. Then adde 5400 with 6000, and they make 11400 for your common divisor. Then multiply 100 li. which is the gaines by 5400, and divide the product by 11400, and thereof will come 47 l. $\frac{7}{19}$ for the first mans part of the gaine. Likewise multiply 100 by 6000, & divide the product by 11400, and you shall finde 52 $\frac{12}{19}$: and so much must the second man have for his part of the gaine.

2. Two Merchants have companied together, the first hath laid in, the 1 of January, 640 l. The second can lay in nothing untill the 1 of April. I demand how much he shall then lay in, to the end that he may take half the gaine? Answ. multiply 640 l. by 12 months, that his money abideth in company, and thereof will come 7680 l. for his laying in. And so much ought the second man to lay in, for because he taketh $\frac{1}{2}$ of the gain. But for that, that he putteth in nothing untill the 1 of April, his money can be in company no longer then nine monthe. And therefore divide 7680 by 9, and thereof will come 853 l. $\frac{1}{3}$. So much ought the second Merchant to lay in the 1 of April, to the end that he may take the one half of the gains.

3. Three Merchants have companied together. The first laid in the 1 of March 100 li. The second laid in the 1 of June so much money, that of the gaine he must have the $\frac{1}{3}$ part: and the third laid in the 1 of November so much money, that of the gaines he must have likewise $\frac{1}{3}$, and they continued in company untill the nert March following. I demand how much the second and the third Merchants did lay in? Answ. Multiply 100 l. which the first man

did

did lay in, by twelve months, that his money continued in company, and thereof cometh 1200 for his laying in, and ſo much ought the ſecond and the third Merchants each of them to lay in, becauſe they part the gaines by thirds. But for that that the ſecond Merchant layeth in nothing till the 1 of June, his money can be in company but 9 months. Therefore divide 1200 by 9 months, and thereof will come 133 1/3. And ſo much ought the ſecond Merchant to lay in. Then, forasmuch as the third Merchant did lay in nothing untill the 1 of November, his money abideth in company but the ſpace of 4 months. Therefore divide 1200 by 4, and thereof cometh 300 l. And ſo much ought the third Merchant to lay into company.

4. Three Merchants have companied together, the firſt laid in, the 1 of Januarij, 100 Duckets. The ſecond hath laid in 50 pound the 1 of March, and the third put in a Jewell, the 1 of July, and at the years end, they had gained 400 crownes: of the which the firſt Merchant muſt have 50 Crowns, and the ſecond muſt have 80. I demand what the Ducket was worth, and at what price the Jewell was valued, which the third Merchant laid in? Anſw.

The

The firſt mans mony being 100 Duckets multiplied by 12 is 1200 Duckets by the rule aforeſaid, and he taketh 50 Crownes for the gaine: therefore ſay if 50 Crownes gain be come of 1200, which was his ſtock, of how much ſhall come 80 Crowns gain, that the ſecond man taketh? multiply and divide, and you ſhall finde 1920, for the ſecond Merchants laying in. Then ſay again, if 50 Crowns be come of 1200 ſtock, of how much ſhall come 2700 Crownes, which the third man taketh of the gaine? multiply and divide, and you ſhall finde 6480 for the third Merchants laying in. Then divide 1920, which is the ſecond mans laying in, by 10 months, that his money did continue in company, and you ſhall finde 192 Duckets, which are worth 50 li. becauſe he laid in 50 li. Then divide 50 li. (being firſt reduced into ſhillings by the ſaid 192 Duckets) and thereof will come 5 ſhillings 1 pence $\frac{1}{2}$. So much was the Ducket worth: Finally, divide 6408, (which is the third mans laying in) by 6 months that his Jewell remained in company, and you ſhall finde 1080 Duckets, and for that price was the Jewell put into company.

5. Three Merchants have companied together:

ogether: The first laid in the 1 of January 100 li. and the 1 of April he hath taken back againe 20 li. The second hath laid in the 1 of March 60 li. and afterward he did lay in more 100 li. the 1 of August. The third laid in the 1 of July 150 li. And the 1 of October he did take back againe 50 pounds. And at the years end, they found that they had gained 160 pounds. I demand how much every man shall have of the gaine? Answer. Multiply 100 pounds which the first man laid in by twelve months, and thereof cometh 1200 pounds, from that number abate nine times 20 li. which are 180 for that which he did take back againe: and there will remaine 1020, for the first mans laying in: Then multiply 60 which the second man laid in by 10, and you shall have 600: unto the which adde 5 times 100 li. for the money he laid in more the 1 of August, which are 500, so all amounteth to 1100 for the second mans laying in. Afterwards multiply 150 pound, which the third man hath laid in, by 6 months, and thereof cometh 900, from the which number abate 3 times 50, and they are 150 for the money that he did take back againe, the first of October, so there will remaine 750, for the third

mans

mans laying in. Then proceed with the rest, as is taught in the first Question of the Rule of Fellowship with time in adding 1020. 1100 & 750 all together, which shall be your division. Then multiply 160 l. which is the gaine by 1020, by 1100, and by 750: and divide at every time by your division, that is to say, by all their layings in, added together, which is 2870: so you shall finde $56\frac{252}{287}$ for the first man: $61\frac{21}{287}$ for the second: and $41\frac{211}{287}$ for the third man.

6. Two Merchants have companied together, The first hath laid in 960 pounds for the space of 12 months, and he ought to have 8 pound upon the 100 pound of the gaine. The second hath laid in 1120 pound for the space of 8 months, and he ought to have after 12 pound upon the 100 pound of the gaine.

And at the yeares end, they have gained 800 l. I demand how much each of them shall have of the gaine? Ans. multiply 960 that the first man did lay in by 12 months, and the product thereof multiply againe by 8, and you shall have 92160, for the first mans laying in: then multiply the 1120 that the second hath laid in by 8 months, and that which cometh thereof, you shall multi-

multiply againe by 12, and you shall finde 107520, for the second mans laying in. Then proceed with the rest, as in the first question of the Rule of Fellowship is declared, as in the last example I have taught you, and you shall finde 369 pound $\frac{1}{16}$ for the first man: and 430 pound $\frac{15}{13}$ for the second man.

The Rule of Company, between Merchants, and their Factors.

NOte that the estimation of the body, or person of a Factor, is in such proportion to the stock which the Merchant layeth in as the gaine of the said Factor is unto the gaine of the Merchant. As thus, if a Merchant doe deliver into the hands of his Factor 200 pound to employ, and he to have half the profit, the person of the said Factor shall bee esteemed to bee worth 200 pound. And if the Factor doe take but the $\frac{1}{3}$ of the gaine, he should have but $\frac{1}{2}$ so much of the gaine as the Merchant taketh which must have $\frac{2}{3}$: wherefore the person of the Factor is esteemed but the $\frac{1}{2}$ of that which the Merchant layeth in, that is to say, 100 pound.

And if the Factor did take the $\frac{3}{4}$ of the gain,

gaine, then the Merchant shall take the residue, which are $\frac{2}{3}$ of the gaine: wherefore the gaine of the Merchant unto that of the Factor, is in such proportion as 3 unto 2. Then if you will know the estimation of the person of the Factor, say if 3 give me 2, what will 200 give? multiply 200 by 2, and divide by 3, so you shall finde $133\frac{1}{3}$. Or otherwise you must consider that the Factor taketh the $\frac{2}{3}$ of that which the Merchant taketh. And therefore take the $\frac{2}{3}$ of 200, and you shall finde $133\frac{1}{3}$ as before: and so much is the person of the Factor esteemed to be worth.

8. And if the Merchant should deliver unto his Factor 200 li. and the Factor should lay in 40 li. and his person to the end he might have the halfe of the gaine: I demand for how much shall his person be esteemed?

Answer. Abate 40 li. from 200 li. and there will remaine 160 li. and at so much shall his person be esteemed.

And if the Factor would take the $\frac{2}{3}$ of the gaine, his person with his 40 pound shall be esteemed twice as much as the stock that the Merchant layeth in, which should have put $\frac{1}{3}$ of the gain, for $\frac{2}{3}$ unto $\frac{1}{3}$ is in double proportion. Wherefore double

200 pounds, and thereof cometh 400 li. from the which abate 40 li. and there will remaine 360 li. But if the Factor would take onely the $\frac{1}{4}$ of the gain, that shall be but the $\frac{1}{8}$ of $\frac{2}{3}$ which the Merchant taketh: and then the estimation of his person with his laying in should be esteemed but the half of that which the Merchant layeth in: you muth therefore take the $\frac{1}{2}$ of 200 li. which is 100 li. from the which you shall abate 40 l. and the rest which is 60 l. is the estimation of his person.

9. If it so chance for to make traffick of 240 l. that the person of the Factor should be in such wise esteemed that he should have but the $\frac{1}{4}$ of the gain, and yet he would have the $\frac{1}{3}$. I demand how much ready money he ought to lay in, besides his person? Answ. Seeing that his person gaineth the $\frac{1}{6}$, therefore all the whole laying in, which is 240 l. shall gain the rest, that is to say, the $\frac{1}{4}$. Now because $\frac{1}{4}$, is the $\frac{3}{4}$ of $\frac{1}{4}$, therefore his person shall be esteemed the $\frac{1}{3}$ of all the laying in. Take then the $\frac{1}{3}$ of 240 li. and you shall have 80 li. for the estimation of his person, and for because that he will have half of the gaine, you shall adde 80 l. with 240 li. and thereof commeth 320 li. of the which take the half, which is 160 l.

and

and from the same you shall abate the 80 l. and there will remaine other 80 l. which he ought to lay in of ready mony, and the Merchant must lay in the over-plus, which amounteth to 160 l.

10. A Merchant hath delivered to the Factor 1200 l. to govern them in the trade of merchandize upon such condition, that he for his service shall have the $\frac{1}{3}$ of the gaine, if any thing be gained, and he shall beare the $\frac{1}{3}$ of the losse, if any thing be lost: I demand, for how much his person was esteemed? Answ. Seeing that the Factor taketh the $\frac{1}{3}$ of the gain, his person ought to be esteemed as much as $\frac{1}{2}$ of the stock which the Merchant layeth in, that is to say, the $\frac{1}{2}$ of 1200 l. which is 600 l. The reason is, for because the $\frac{1}{3}$ of the gaine that the Factor taketh, is the $\frac{1}{2}$ of the $\frac{2}{3}$ of the gaine that the Merchant taketh. And so the Factor his person is esteemed to bee worth 600 l.

11. A Merchant hath delivered unto his Factor 1200 l. and the Factor layeth in 500 l. and his person. Now because he layeth in 500 l. and his person, it is agreed between them, that he shall take $\frac{2}{3}$ of the gaine: I demand, for how much his person was esteemed? Answ. For as much as the

Factor

Factor taketh the $\frac{2}{5}$ of the gaine, he taketh the $\frac{2}{3}$ of that which the Merchant taketh, for $\frac{2}{5}$ are the $\frac{2}{3}$ of $\frac{3}{5}$: and therefore the Factors laying in, ought to be 800 l. which is the $\frac{2}{3}$ of 12000 l. that the Merchant laid in. Then abate 500 l. which the Factor did lay in from 800 li. which ſhould be his whole ſtock, and there remaineth 300 li. for the eſtimation of his perſon.

12. More, a Merchant hath delivered unto his Factor 1000 li. upon ſuch condition, that the Factor for his paines and ſervice, ſhall have the gaines of 200 li. as though he laid in ſo much ready money: I demand what portion of the gaine the ſaid Factor ſhall take? Anſw. See what part the 200 li. (which the Factor laid in) is of 1200, which is the whole ſtock of their company, and you ſhall finde that is the $\frac{1}{6}$, and ſuch part of the gaine ſhall the Factor take.

But in caſe, that in making their covenants, it were agreed between them, that the Factor ſhould have the gaine of 200 li. of the whole ſtock which the Merchant layeth in, that is to ſay, of the 1000 l. then ſhould the Factor take the $\frac{1}{5}$ of the gaine: for 200 l. is the $\frac{1}{5}$ of a 1000 l.

Chap. 11.

Of the Rules of Barter: that is to say, to change Ware for Ware, &c.

1 TWo Merchants will change their merchandize, the one with the other. The one of them hath Cloth of 7 s. 1 d. the yard, to sell for ready money, but in barter he will sell it for 8 s. 4 d. The other hath Cinamon of 4 s. 7 d. the pound, to sell for ready mony; I demand how he shall sell it in barter that he be no loser? Answ. Say if $7\frac{1}{12}$ (which is the price that the yard of Cloth is worth in ready money) be sold in barter for $8\frac{1}{3}$, for what shall $4\frac{7}{12}$ be sold in barter, which $4\frac{7}{12}$ is the price that the pound of Cinamon is worth in ready money? reduce the whole numbers into their broken, and then multiply & divide and you shall find 5 s. 4 d. $\frac{12}{17}$ parts of a peny, and for so much shall he sell the pound of Cinamon in barter.

2. Two Merchants will barter their merchandize the one with the other: The one of them hath Chamblets, of 2 l. 18 s. 4 d. the piece, to sell for ready mony, and in barter he will sell the piece for 4 l. 3 s. 4 d. The other hath fine Caps of 35 s. 10 d. the dozen, to

to ſell in barter. I demand what the dozen of Caps were worth in ready money? Anſ. Say, if 4 l. 3 s. 4 d. which is the over-price of the piece of chamblet, become of 2 l. 18 s. 4 d. which was the juſt price of the ſame, of what ſhall come 35 s. 10 d. which is the over-price of the dozen of caps? multiply and divide, and you ſhall finde 25 s. 1 d. and ſo much are the dozen of caps worth in ready money.

3. Two Merchants will change their merchandize the one with the other: the one of them hath Fuſtians of 18 s. 4 d. the piece to ſell for ready money, and in barter he will ſell the piece for 26 s. 8 d. The other hath Tapeſtry of 15 d. the ell to ſell for ready mony, and in barter he will ſell it for 20 d. the ell. I demand which of them gaineth, and how much upon the 100 l. of money? Anſw. Say if 18 s. $\frac{1}{3}$ (which is the juſt price of the piece of Fuſtian) be ſold in barter for 26 s. $\frac{2}{3}$: for how much ſhall 1 ſhil. $\frac{1}{40}$ (which is the juſt price of the ell of Tapeſtry) be ſold in barter? multiply and divide, and you ſhall find 21 d. $\frac{2}{11}$. And he doth over-ſell it but for 20 d. So that of 21 $\frac{2}{11}$ he maketh but 20 d. And therefore ſay by the Rule of 3, if the ſecond Merchant of 21 $\frac{2}{11}$ do make but $\frac{20}{11}$, how much ſhall he

lose in the $\frac{100}{1}$? multiply and divide, and you shall find 91 $\frac{2}{3}$ the which being abated from 100, there will remaine 8 $\frac{1}{3}$. And after the rate of 8 $\frac{1}{3}$, doth the second Merchant lose in the 100. And consequently, the first Merchant of 20 d. maketh 21 d. $-\frac{2}{11}$, and therefore say againe by the Rule of Three, if the first Merchant of $\frac{20}{1}$ do make 21 $-\frac{2}{11}$, how much shall he gain upon $\frac{100}{1}$? multiply and divide, and you shall finde 109 l. $-\frac{1}{11}$. And thus the first Merchant gaineth after the rate of 9 l. $-\frac{1}{11}$ upon the 100 l. of money.

Note. For your better understanding of these questions, you must note, that when one Merchant gaineth of another after the rate of 10 l. upon the 100 l. he gaineth the $\frac{1}{10}$ of his own principall, and the other which loseth after the rate of 9 $\frac{1}{11}$ in the 100 l. he loseth the $\frac{1}{11}$ of his principall. And it may be proved thus: when one Merchant will sell his wares unto another, which wares stand him but in a 100 li. and he will sell them for 110 l. therefore he of his 100 li. maketh 110 li. and so he gaineth after 10 li. upon the 100, which is the $\frac{1}{10}$ of his principall, & the other which buyeth wares for 110 li. that cost the other but 100 li. of the 110 li. he maketh but 100 li. And therefore, say by the Rule of Three, if 110 be come of

100

100, how much ſhall come 100? multiply and diuide, and you ſhall finde 90 $\frac{10}{11}$, the which abate from 100, and there will remaine 9 $\frac{1}{11}$ which is the $\frac{1}{11}$ of the principall that the ſecond loſeth in the 100 li. as before is ſaid. And therefore, who ſo that will know what one Merchant gaineth of another, either after the rate of 10 l. upon the 100 li. which is the $\frac{1}{20}$ of his principall, or elſe after the rate of 20 li. upon the 100 li. which is the $\frac{1}{5}$, or of any other part, and that he would likewiſe know what part the other loſeth of his principall, he muſt take for the numerator of the broken number of him that loſeth, as much as for him that gaineth, then adde the numerator and the denominator (of the broken number of him that gaineth) both together, and make therof the denominator of the broken number of him that loſeth, & then ſhall you haue the juſt part of him that loſeth: as by example, of him that gaineth after 10 l. upon the 100 l. which is the $\frac{1}{10}$ of his principall: take the numerator of $\frac{1}{10}$ which is 1, and make that the numerator of the broken number of him that loſeth, then add 1, which is the numerator of the fraction of him that gaineth with 10, which is his denominator, and you ſhall haue 11 for the denomina-

for of the fraction of him that loseth. Then put 1 over the 11, and so you shall have $\frac{1}{11}$. Thus it appeareth when one Merchant gaineth of another after 10l. upon the 100l. he gaineth the $\frac{1}{10}$ of his principall, and the other loseth $9\frac{1}{11}$, which is the $\frac{1}{11}$ of his principall. And if he would gaine after 20 upon the 100 li. which is the $\frac{1}{5}$ of his principall, the other should lose $16\frac{2}{3}$, which is the $\frac{2}{3}$ of his principall, and so is to be understood of all other fractions.

4. Two Merchants will change their merchandize, the one with the other, the one of them hath Sayes of 20 s. and 10 d. the piece to sell for ready money: and in barter he will sell the piece for 23 s. 4 d. and yet he will gaine moreover, after 10 l. upon the 100 li. The other hath Wooll of 50 shil. the 100 weight to sell for ready money. I demand how he shall sell C. of Wooll in barter? Answ. Say if 20 s. 10 d. which is the just price of the piece of Say, he sold in barter for 23 s. 4 d. for how much shall 50 s. (which is the just price of the C. of Wooll) be sold in barter? multiply and divide, and you shall find 56 s. Then for because the first Merchant will gaine after 10 li. upon the 100 li. he maketh of his 100 li. 110 li. so the second Merchant maketh

keth of 110 li. but 100 l. And therefore ſay by the Rule of Three, if the ſecond Merchant of 110 doe make but 100, how much ſhall he make of 56? multiply and divide, and you ſhall finde 50 s. 10 d. $\frac{10}{11}$ of a peny; & for ſo much ſhall he ſell the C. of Wooll in barter.

5. More, two Merchants will change their merchandize the one with the other, the one of them hath Taffata of 16 crowns the piece, to ſell for ready mony, and in barter he will ſell the piece for 20 crowns, and yet he will gaine moreover after the rate of 10 li. upon the 100 l. The other hath Ginger of 3 s. 9 d. the pound weight, to ſell in barter. I demand what the pound did coſt in ready mony? Anſw. Say if 20 crownes which is the ſurprice of the piece of Taffeta, become of 16 crownes the juſt price, of how much ſhall come 3 s. 9 d. which is the ſurprice of the pound of Ginger? multiply and divide, and you ſhall finde 3 ſhil. Then, for becauſe that the Merchant of Taffata will gaine after the rate of 10 upon the Hundred: Say if one Hundred doe give 100, what ſhall 3 s. give? multiply and divide, and you ſhall find 3 s. 3 d. $\frac{3}{5}$, and ſo much did the pound of Ginger coſt in ready money.

6. More, two Merchants will change their merchandize, the one with the other, the one of them hath Worſteds of 25 s. the piece to ſell for ready money, and in barter he will ſell the piece for 33 s. 4 d. and yet he loſeth after 10 li. in the 100 li. the other hath Wax of 3 li. 6 s. 8 d. the 100 weight to ſell for ready money. I would know for what price he ſhould ſell his Wax in barter? Anſw. Say if 25 s. which is the juſt price of the piece of Worſted be ſold in barter for 33 s. 4 d. for how much ſhall 3 li. 6 s. 8 d. be ſold? which is the juſt price of the C. of Wax, as it was worth in ready money: multiply and divide, and you ſhall finde 4 l. $\frac{4}{9}$ which is 8 s. 10 d. $\frac{2}{3}$, then for becauſe that the Merchant of Worſteds, loſeth after 10 li. in the 100 li. of 100 li. he maketh but 90, and therefore ſay, if 90 give 100, what giveth 4 l. $\frac{4}{9}$? multiply and divide, and you ſhall finde 4 l. $\frac{76}{81}$, which is worth 18 s. 9 d. $\frac{5}{27}$, and for ſo much ſhall he ſell the 100 l. weight of Wax in barter.

7. More, two Merchants will change their merchandize the one with the other: the one of them hath Worſteds of 5 l. 6 s. 8 d. the piece to ſell for ready money, and in barter he will ſell the piece for 6 l. 13 s. 4 d. and yet he loſeth after 10 l. in the 100.

and

and the other hath Muske of 2 s. 9 d. $\frac{1}{3}$ the pound weight to ſell in barter. I demand what the pound did coſt in ready money? Anſw. Say if 6 li. $\frac{2}{3}$, which is the over-price of the piece of Worſted, become of 5 l. $\frac{1}{3}$, which is the juſt price of the ſame, of how much ſhall come 2 s. 9 d. $\frac{1}{3}$? multiply and divide, and you ſhall find 2 s. $\frac{2}{9}$, which $\frac{2}{9}$ is 2 d. $\frac{2}{3}$: then for becauſe that the Merchant of Worſteds loſeth after 10 l. in the 100 l. of a 100 he maketh but 90: and therefore ſay, if 100 give but 90, how much ſhal 2 s. $\frac{2}{9}$ give? multiply and divide, and you ſhall find 2 s. and ſo much coſt the pound of Muske in ready money.

Other Rules of Barter, wherein is given ſome part in ready money.

WHen a Merchant overſelleth his merchandize, and he will have alſo ſome part of his over-price in ready mony: as the $\frac{1}{2}$, the $\frac{1}{3}$, or the $\frac{1}{4}$, &c. He muſt ſubſtract the ſame part of money from the juſt price, and alſo from the over-price of his Merchandize: and the two numbers that remaine after the ſubſtraction is made, ſhall be the two firſt numbers in the Rule of Three: & the juſt price of the ſecond Merchant ſhall be the third number: to know how

how much he shall over-sell the part of his merchandize.

Example.

8. Two Merchants will change their merchandize the one with the other, the one of them hath fine Wooll at 5 l. the 100 pound weight to sell for ready money, and in barter he will sell it for 6 li. and yet he will have the $\frac{1}{3}$, in ready money. The other hath cloth of 13 s. 4 d. the yard to sell for ready money. I would know how he shall sell the same in barter? Answ. take the $\frac{1}{3}$ of 6 li. which is the over-price of the 100 of Wooll, and that is 2 li. the which you must abate from 5 li. which is the just price of the C. of Wooll, and also abate it from 6 l. which is the over-price, and there shall rest 3 l. and 4 l. for the two first numbers in the Rule of Three; then take 13 s. 4 d. which is the just price of a yard of cloth, for the third number: Then multiply and divide, and you shall find 17 s. 9 d. $\frac{1}{3}$, for so much shall the second sell his cloth in barter.

9. More, two Merchants will change their merchandize the one with the other, the one of them hath Wax of 3 li. 6 s. 8 d. the C. to sell for ready money, and in barter he will sell the same for 4 l. 3 s. 4 d. and yet he

he will have the ¼ in ready money. And the other hath fine crimſon Satten of 15 s. the yard, to ſell in barter. I demand what it is worth in ready money? Anſw. Take the ¼ of 4 li. 3 s. 4 d. which is 1 li. 0 s. 10 d. and abate it from 4 l. 3 s. 4 d. and alſo from 3 l. 6 s. 8 d. and there reſteth 3 l. 2 s. 6 d. and 2 l. 5 s. 10 d. for the two firſt numbers in the Rule of Three. And 15 s. for the third number, which 15 s. is the over-price of the yard of Satten. Then multiply and divide, and you ſhall finde 11 s. And ſo much did the yard of Satten coſt in ready money.

10. Two Merchants will change their merchandize the one with the other: the one of them hath Tin of 50 s. C. weight, to ſell for ready money, and in barter he will ſell it for 3 l. 6 s. 8 d. and he will gaine after 10 l. upon the 100 l. & yet he will have alſo the one half in ready money. The other hath Lead of 3 half pence the pound, to ſell for ready mony. I demand how he ſhall ſell the pound of Lead in barter? Anſ. See firſt at 10 l. upon the 100 l. what the 3 l. ⅓ will come unto, in ſaying by the Rule of Three, if 100 give 110, what will 3 ⅓ give? multiply and divide, and you ſhall find that they will come to 3 l. ⅓. which is 13 s. 4 d. of the which, the half which he demandeth

in

in ready money, is 36 s. 8 d. the same being abated from 50 s. and also from 3 l. 13 s. 4 d. there will remaine 13 s. 4 d. and 1 l. 16 s. 8 d. for the two first numbers in the Rule of Three, which you must put all into half-pence, and the aforesaid three half-pence shall be the third number, and then multiply & divide, and you shall find 4 d. $\frac{1}{8}$, and for so much shall he sell the 1 l. of Lead in barter.

11. More, two Merchants will change their merchandize the one with the other: the one of them hath Steel of 16 s. 8 d. the 100 li. weight, to sell for ready money, and in barter he will sell it for 25 shil. and yet he loseth after 10 li. in the 100 li. but he will have the $\frac{1}{2}$ in ready money: the other hath Iron of 6 s. 8 d. the C. to sell in barter. I demand what the hundred of Iron did cost in ready money? Answer. Say if 100 come but to 90, how much shall 25 s. come to? multiply and divide, and you shall find 22 s. 6 d. of the which number, take the $\frac{1}{2}$ which is 11 s. 3 d. and subtract it from 22 s. 6 d. and also from 16 s. 8 d. and there will remaine 11 s. 3 d. and 5 s. 5 d. for the two first numbers in the Rule of Three, & 6 s. 8 d. which is the over-price of a C. of Iron for the third number: then multiply

and

and divide 4, you ſhall find 3 s. 2 d. $\frac{18}{27}$: and ſo much did the C. of Pyon coſt in ready money.

12. More, two Merchants will change their merchandize the one with the other: the one of them hath Sales of 20 s. 10 d. the piece to ſell for ready money, and in barter he will ſell the piece for 25 s. and he will have the $\frac{1}{4}$ in ready money. The other hath Caps of 35 s. the dozen, to ſell for ready money, but he will gaine after the rate of 10 l. upon the 100 l. I demand how he ſhall ſell a dozen of Caps in barter? Anſw. Say if 100 be worth 110, what ſhall 35 ſhil. be worth, which is the juſt price of the dozen of Caps? multiply and divide, and you ſhall finde 38 ſhil. 6 d. then take $\frac{1}{4}$ of 25 s. which is 6 s. 3 d. and ſubſtract it from 20 s. 10 d. and alſo from 25 s. and there will remaine 14 s. 7 d. and 18 s. 9 d. for the two firſt numbers in the Rule of Three, and 38 s. 6 d. which is the juſt price with his gaine in the dozen of Caps for the third number: then multiply and divide, and you ſhall find 49 s. 6 d. and for ſo much he ſhall ſell the dozen of Caps in barter.

Chap. 12.

Of Exchanging of Money from one place to another.

FIrſt you muſt note, that at Antwerpe they uſe to make their accounts by Denters de gros, that is to ſay, by pence Flemmiſh, whereof 12 doe make 1 ſhil. Flemmiſh, and 20 ſhil. Flemmiſh doe make 1 l. de gros.

Example.

1. If I deliver in Flanders 500 l. Flemmiſh at 19 ſhil. 6 d. de gros, that is to ſay, at 19 ſhil. 6 d. Flemmiſh, to receive 20 s. at London; I demand how much I ſhall receive ſterling at London for the ſaid 500 li. Flemmiſh? Anſw. Say if 19 $\frac{1}{2}$ give $\frac{20}{1}$, what will $\frac{500}{1}$ give? multiply and divide, and you ſhall finde 512 l. 16 s. 4 d. $\frac{1A}{13}$ of a d. And ſo much ſterling ſhall I receive in London for my 500 l. Flemmiſh.

2. If I deliver in London 375 li. ſterling, to receive in Antwerp 21 s. 9 d. the gros, that is to ſay, Flemmiſh, for every ſterling. I demand how many pounds Flemmiſh I ſhall receive in Antwerpe for the ſaid 375 l. ſterling? Anſwer. Say if $\frac{22}{1}$ give $21\frac{1}{4}$ what will $\frac{375}{1}$ give? multiply & divide

vide and you ſhall finde 407 l. 16 ſhil. 3 d. ſo many pounds Flemmiſh ſhall I receive at Antwerp for the ſaid 375 li. ſterling in Antwerp.

3. If I take up money at Antwerp, after 19 s. 6 d. Flemmiſh, to pay for the ſame at London 20 s. ſter. and when the day of payment is come, I am forced to returne the ſame, and to take up money againe in London to pay my Bill of Exchange, ſo that for 20 s. which I take up here I muſt pay 19 s. 6 d. at Antwerp. I demand whether I doe win or loſe, and how much in, or upon the 100 l. of money? Anſw. Say, if 19 $\frac{1}{2}$, give 19 $\frac{1}{2}$, what will $\frac{100}{1}$ give? multiply and divide, and you ſhall find 98 $\frac{78}{79}$, the which being abated from 100 there will remaine 1, $\frac{21}{79}$. And ſo much doe I loſe upon the 100 l. of money.

4. If I take up at London 20 s. ſterling to pay at Antwerp, 21 s. 8 d. Flemmiſh; and when the day of payment is come, my Factor is conſtrained to take up money againe at Antwerp, wherewith to pay the foreſaid ſum: and there he doth receive 22 ſhil. Flemmiſh, for the which I muſt pay 20 s. at London. Now I demand whether I doe win or loſe, and how much upon the 100 l. of mony after the rate? Anſw. Say, if

21 $\frac{2}{3}$ give $\frac{22}{1}$. what will $\frac{120}{1}$, give? multiply and divide, and you shall finde 101 $\frac{7}{13}$, from the which abate 100, and there will remaine 1 $\frac{7}{13}$, and so much shall I gaine upon the 100 li. of money.

The Exchange from London into France, is not like as it is in Flanders, but is delivered by the French Crowne, which is worth 50 Souse Tournois the piece.

And here must you note, that in France they make their account by deniers Tournois, whereof 12 Deniers maketh 1 Souse Tournois, & 20 Souse Tournois maketh 1 li. Tournois, which they call a Livre or Franc, and the French Crowne is currant among Merchants for 51 souse Tournois, but by exchange it is otherwise, for they will deliver but 50 Souse Tournois, which is 2 li. 10 Souse Tournois for a Crowne, and at such price the Crowne, as the Taker up of money can agree with the Deliverer.

Example.

5. If I deliver 340 li. ster. here in London, after 6 s. 4 d. sterling the Crowne, to receive at Roan, or at Paris 50 Souse Tournois for every Crown, I would know how many Livres Tournois I shall receive

receive there for my 340 l. ſterling? Anſw. Say if 6 ſhil. $\frac{1}{3}$ ſterling doe give me 2 li. $\frac{1}{2}$ Tournois, what will $\frac{6800}{1}$ s. give? (which is the 340 li. reduced into ſhillings.) Then multiply and divide, and you ſhall finde 2684 Liures, $\frac{4}{19}$ which is worth 4 ſouſe $\frac{4}{19}$ Tournois, and ſo much ſhall I receive in Roan or Paris for my 340 l. ſterling.

6. If I deliver in Paris or Roan, or elſwhere in France 1250 Liures Tournois, at 50 ſouſe Tournois the Crowne, to receive for every ſuch Crowne 6 s. 3 d. ſterling in London. I demand how much ſterling money I ſhall receive at London for my 1250 pound Tournois? Anſwer. Say if 2 l. $\frac{1}{2}$, doe give me 6 s. $\frac{1}{4}$, what will $\frac{1250}{1}$ give? multiply and divide, and you ſhall finde 3125 s. ſterling, which maketh 156 l. 5 s. ſterling. And ſo many pounds ſhall I receive at London for the ſaid 1250 Liures Tournois, after 6 s. 3 d. for every Crowne of 50 ſouls.

Chap. 13.

Of the Rule of Alligation or Mixture.

THe Rule of Alligation is so named for that it teacheth to alligate or binde together divers parcels of sundry prices, and to know how much you shall take of every parcell, according to the numbers of the question, the which Rule is distinct into two parts: as followeth.

The first part of the Rule of Alligation sheweth how to make a mixture of divers things being of sundry prices: And of the same thing so mixed to know the common price of the said mixture.

Example.

1. A man would mix 5 bushels of Wheat at 2 s. 8 d. the bushel, with 9 bushels of Rie, at 2 shil. the bushel, and would know how much the bushel so mixed doth stand him in, the one with the other? Answ. For to know the same common price, you must multiply every thing by his price, and adde all the products together: the which you must divide by the number of all the things that are to be mixed, and the quotient will answer

anſwer to the queſtion, as in the aforeſaid example, I multiply 5 buſhels by his price, that is to ſay by 2 s. 8 d. and thereof cometh 13 s. 4 d. Likewiſe I multiply 9 buſhels by 2 s. maketh 18 s. both theſe ſums added together, doe make 31 s. 4 d. the which I doe reduce into pence: and they make 376 pence. Then I divide 376 by 14 which is the number of all the buſhels, and my quotient will be 26 pence and $\frac{4}{14}$, and ſo much doth one Buſhel of both the ſorts of graine ſtand him in.

2. If you have two ſeverall things, whereof you would mix equall portions together, you muſt adde their prices, and take onely the $\frac{1}{2}$; if you would mix together equal portions of three things, you muſt take $\frac{1}{3}$; and of foure, the $\frac{1}{4}$, and ſo continuing, as by Example: Wheat of 2 s. 8 d. the buſhel and Rie of 2 s. the buſhel being mingled by equall proportions, I adde 2 s. 8 d. and 2 s. together, and they make 4 s. 8 d. whereof the one $\frac{1}{2}$ is 2 s. 4 d. and ſo much is the value of 1 Buſhel of ſuch a mixture. And if there were a portion of Barly at 20 d. then I muſt adde 2 s. 8 d. 2 s. & 20 d. together and they make 6 s. 4 d. whereof the $\frac{1}{3}$ which is 2 s. 1 d. $\frac{1}{3}$ ſhould be the price of 1 buſhel of that mixture.

3. A Merchant hath 27 li. weight of large Cloves at 6s. the li. 15 l. of the middle sort at 2 s. 6 d. the l. And 10 l. of Fusse at 2 s. 2 d. the li. when all that same are mixed together, I would know how much the li. is worth? Answer. You must multiply every thing by his price, and then divide the totall summe of the products, by the whole weight of the drugs, and you shall finde 4 shil. 3 d. $\frac{1}{26}$, and so much is the pound of that mixture worth.

27	at	6 s. 0 d.	162
15	at	2 s. 6 d.	$37\frac{1}{2}$.
10	at	2 s. 2 d.	$21\frac{2}{3}$.
52			$221\frac{1}{6}$.

4. And if you would mix $\frac{1}{2}$ large Cloves, $\frac{1}{3}$ of middle, and $\frac{1}{6}$ of Fusse, and you would know how much the pound weight were worth, you must take a number which containeth those parts: as. for example 12; whereof the $\frac{1}{2}$, which is 6 shall signifie so many li. of large Cloves: The $\frac{1}{3}$ which is 4, shall be so many li. of the middle, and the $\frac{1}{6}$ which is 3. shall be so many li. of Fusse. When afterwards you must multiply every drug by his price, and divide the totall sum of all the products, by the whole sum of the

the drugs, and you ſhall finde 4 s. $\frac{1}{26}$. And ſo much is 1 pound weight of the mixture.

6. at 6 s. 0 d.	36
4. at 2 s. 6 d.	10
3. at 2 s. 2 d.	06$\frac{1}{2}$
13	52$\frac{1}{2}$

5. And if you would make 100 li. weight of ſuch a mixture, you ſhall worke by the Rule of Company, and you ſhall finde 46 li. $\frac{2}{13}$ of large Cloves, 30 li. $\frac{10}{13}$ of middle. And 23 $\frac{1}{13}$ of Fuſt.

6	13	100	6? Anſ. 46$\frac{2}{13}$
4			4? Anſ. 30$\frac{10}{13}$
3			3? Anſ. 23$\frac{1}{13}$
13			100

6. A Gold-ſmith hath 8 li. weight of ſilver billion of 7 ounces fine, more 15 li. of 8 ounces $\frac{1}{2}$ fine, and 13 li. weight of 10 ounces fine, and he will melt all theſe together, and make of them one maſſe. The queſtion is to know of what fineneſſe the Pound weight is? Anſw. You muſt multiply the number of the weights of every Billion by his fineneſſe, and thereof will come the ounces and parts of ounces fine, the which you muſt adde together, and they

will make 313 ounces $\frac{1}{2}$ of fine, the same you must divide by 36, which is the whole summe of the pound weight of Billion, and you shall finde 8 ounces and $\frac{18}{72}$ remaining, which $\frac{12}{72}$ parts of an ounce is worth 14 peny weight and 4 graines, and so much is the pound weight of this mixture worth.

8 Lib.	at	7 ounc. is	56
15	at	8 ounc. $\frac{1}{2}$ is	127 $\frac{1}{2}$
13	at	10 ounc. is	130
36			313 $\frac{1}{2}$

7. A Goldsmith hath 3 sorts of Silver Billion, that is to say, 5 li. 7 ounces 10 peny weight, at 7 ounces $\frac{1}{2}$ fine: 12 li. 3 ounces, at 6 ounc. $\frac{4}{5}$ fine. And 4 l. at 9 ounces fine. All the which he will melt into one masse. The question is to know, of what fineneſſe the li. weight of that mixture shall be? Anſ. You must multiply every Billion by his fineneſſe, as afore. And adde together all the products, & they doe amount to 155 l. $\frac{17}{48}$. Then adde all the weights of the Billions together into one summe, and they make 21 l. $\frac{7}{8}$, divide then 155 $\frac{17}{48}$ by 21 $\frac{7}{8}$, and your quotient will be 7 ounces 3 $\frac{3216}{8400}$ remaining, the which $\frac{3216}{8400}$ being brought into peny weights and graines, doe make 3 peny weight, 10 graines $\frac{8}{35}$ of a graine fine:

fine: So you may perceive that the same mixture is of 7 ounces, 2 D. 10 grains, and $\frac{2}{31}$ of a graine fine, the pound weight.

And here is to be noted, that the reckoning of the weights of Silver is thus as followeth, that is to say,

1 li. of Troy weight, maketh 12 Ounces.

1 Ounce is divided into 20 peny weight.

1 Peny weight is distributed into 24 graines.

1 Graine into 20 smaller parts, &c.

And the reckoning for Gold, is thus,

1 Ounce of fine Gold without any alloy, is imagined to be 24 karets.

1 Karet is divided into 4 graines.

1 Graine is parted into 2 half graines or 4 quarters of a graine, &c.

And so into other smaller parts.

8 But if the said Goldsmith would put 5 li. weight of Copper with the said Billions, and you would know of what fineness it is, then you must adde the same 5 li. with the 21 li.$\frac{7}{8}$, and it maketh 26$\frac{7}{8}$. Then divide the aforesaid 157 li. $\frac{17}{48}$, by 26 li. $\frac{7}{8}$, and you shall finde 5 ounces fine, and $\frac{8216}{10320}$ remaining, the which $\frac{8216}{10320}$ is worth 15 peny weight, 22 graines and $\frac{4}{43}$. And of that fineness will the same masse be.

9. A Gold-smith hath melted 12 pound weight, and 5 ounces of Gold Billion, being of 18 Karets fine, with 4 li. weight, 4 ounces and $\frac{1}{2}$, at 21 Karets fine; I demand of what fineneſſe is 1 li. weight of the ſame maſſe? Anſwer. You muſt multiply the weights (by the Karets fine) of each ſort, and adde the products together, the ſame you muſt divide by the whole ſum of all the weights added together, and your quotient will ſhew you of what fineneſſe the ſame is of, as in the former example, I doe multiply 12 li. and 5 ounces by 18 Karets, and thereof commeth 223 Karets $\frac{1}{2}$. Likewiſe I doe multiply 4 li. weight, 4 ounces $\frac{1}{2}$, by 21 Karets, and thereof cometh 91 Karets $\frac{7}{8}$, theſe two ſummes of Karets I do adde together, and they make 315 Karets $\frac{3}{8}$. Then I doe adde 12 li. weight 5 ounces, and 4 li. weight 4 ounces and $\frac{1}{2}$ together, and they make 16 li. 9 ounces $\frac{1}{2}$, the which 9 ounces $\frac{1}{2}$ are $\frac{12}{24}$ parts of a pound: and therefore I divide 315 $\frac{3}{8}$ by 16 li. $\frac{12}{24}$, and thereof commeth 18 Karets, and $\frac{2520}{3224}$ remaining, which fraction is 3 graines, and $\frac{12}{403}$ parts of a graine. And of that fineneſſe is 1 pound weight of the ſaid maſſe.

A Gold-ſmith hath melted 10 pound weight,

weight, 7 ounces, and $\frac{1}{8}$ of 20 Karets, and $\frac{1}{3}$ fine. And 8 pound weight, 2 ounces and $\frac{1}{6}$ parts of 23 Karets fine, with 15 pound weight, 1 ounce of Silver. The queſtion is, of what fineneſſe is the pound weight of the ſaid maſſe? Anſwer. You muſt multiply the weight of every ſort of Gold billion by his allay, that is to ſay, by his fineneſſe, and adde all the products together, and you ſhall finde $405\frac{25}{96}$ Karets, then adde the weight of the Two ſorts of Gold billion, with the weight of the Silver together, and thereof will come 33 pound, 11 ounces, $\frac{1}{24}$, the which 11 ounces $\frac{1}{24}$ is $\frac{262}{288}$ of a pound weight, then divide the ſaid $405\frac{25}{96}$ parts by 33 pounds $\frac{262}{288}$, and you ſhall finde 10 Karets $\frac{46205}{263871}$. And of the ſame fineneſſe ſhall the pound weight of that maſſe of Gold be.

The ſecond part of the Rule of Alligation.

1. A Gold-ſmith hath 4 ſorts of Gold, The firſt is worth 30 Crownes the pound weight; the ſecond is worth 36 Crowns; and the third is worth 42 Crownes; and the fourth is worth 45 Crownes; and of theſe 4 ſorts he will make a Scepter of 6 li. weight, which ſhall be worth 40 Crownes

the

the Pound, I demand how much he muſt take of every ſort? Anſwer. Firſt you muſt ſet downe the numbers whereof you will make the alligation (which are 30, 36, 42, and 45) orderly the one under the other, after the ſame manner as if you would adde them together: and the common number whereunto you will reduce them, you ſhall ſet on the left hand, which common number in this example is 40. Then marke which of the ſaid foure numbers, are leſſer then that common number, and which of them be greater, and with a draught of your pen, evermore linke two numbers together, ſo that the one be leſſer than that common number, and the other greater than it, for two greater, nor two ſmaller numbers may not be linked together, for they will be either leſſer, or elſe greater than the common number, but one greater number, and one ſmaller may be ſo mixed that they will make the common number. And two greater or two ſmaller numbers, can never make the common number in due order, as hereafter ſhall appear.

After that you have thus linked them, then marke how much each of the leſſer numbers is ſmaller than the cõmon number, and that difference you ſhall ſet againſt the

the greater numbers which be linked with those smaller, each of them with his match still on the right hand. And likewise you must set the excesse of the greater numbers against the lesser, which be combined with them. Then shall you adde all those differences into one summe, which shall bee the first number in the Rule of Three, and the second number shall be the whole massy piece that you will have of all the particulars, which in this example was presupposed to be 6 pound. Then the third summe shall in each difference by it selfe, and by them you shall finde out the fourth number declaring the just portion that you shall take of every particular in that mixture, as now by the former example, I will make it more plaine.

21 6 5 | | 21 6 2

21 6 4 | | 21 6 10

Here in this former example, you ſee that I have ſet downe the ſeverall prices, which be 30, 26, 42, 45, and have linked together 30, with 45, and 36, with 42. The common price 40. I have ſet on the left ſide, as before is declared, and the difference of it from every ſeverall price, I have ſet on the right hand, againſt that ſumme with the which it is linked. So the difference of 30, from 40, is 10, which I ſet againſt 45, that he is linked withall; and the difference of 45, above 40 is 5, which I have ſet againſt 30. So likewiſe, the difference of 42, above 40, is 2, that I have ſet againſt 36. And the difference between 36 and 40, (which is 4) I have ſet againſt

42

42. Then I adde all thoſe differences together, namely 5, 2, 4, and 10, and they make 21, which I make the firſt number in the Rule of Three, and 6 pound which is the weight of the Scepter of Gold the ſecond number, and the third number ſhall be every particular difference for every ſeverall working. Then worke by the Rule of Three: ſaying if 21 (which is all the differences added together) doe give me 6 pound weight, which is the weight of the Scepter, what ſhall 5 give, which is the firſt difference? I multiply and divide, and I finde 1 pound weight $\frac{1}{7}$, ſo much muſt I have of the firſt price. Then I doe in like manner with the reſt, and I finde $\frac{4}{7}$ of a pound weight of the ſecond price, 1 pound $\frac{1}{7}$ of the third price, and 1 li. $\frac{4}{7}$ of the fourth; the which 4 ſumms being added together, doe make 6 li. which is the whole weight of the Scepter that I would have. And now to prove if the pieces doe agree, you ſhall doe thus: Firſt multiply this totall ſumme 6 by the common price 40, and it will make 240 Crowns, which you ſhall keepe by it ſelfe. And afterward multiply every ſeverall ſumme of weight by the price belonging to the ſame weight, and if that ſumme doe agree with

the

the firſt that you kept by it ſelfe, then is your worke well done. as here 1 li. $\frac{5}{7}$, is the weight of the ſort of Gold which is of 30 crowns price. Therefore multiply 30 by 1 li. $\frac{5}{7}$, and it maketh 42 crowns $\frac{2}{7}$, which you muſt ſet downe. Then multiply $\frac{2}{7}$ (which is the weight of the ſecond ſort of Gold) by 36 which is the price of the ſame, and thereof cometh 20 crowns $\frac{5}{7}$: ſo againe 1 li. $\frac{5}{7}$, multiplied by 42 crowns, which is the third price, doth make 48 crowns. And laſt of all 2 li. $\frac{4}{7}$, multiplied by 45, maketh 128 crowns $\frac{4}{7}$. All theſe being added together, doth make 240 crowns agreeable to the former ſumme of 40, multiplied by 6. And thus I may affirme that this worke is well done.

2. A Taverner hath 4 ſorts of Wine of 4 ſeverall prices; the firſt of 8 d. the Gallon; the ſecond of 10 d. the Gallon; the third of 15 d. and the fourth of 18 d. And he will mix all theſe ſorts together, ſo that the Gallon ſhall be worth but 12 d. I demand how many Gallons he muſt take of every ſort? Anſw. Firſt ſuppoſe the Punchen to hold ſome certaine meaſure, as to containe 84 Gallons, and then the form will be after this ſort, as you ſee hereafter following.

If 15 doe give 84.

What will 3 give? 16⅘ of the 1.
What will 6 give? 33⅗ of the 2.
What will 4 give? 22⅘ of the 3.
What will 2 give? 11⅕ of the 4.
They make 84

3. A Vintner hath 4 ſorts of ſilver Billon of theſe fineneſſe following. The firſt is of 3 ounces fine; the ſecond of 5 ounces fine; the third of 8 ounces fine; and the fourth of 10 ounces fine. And of all theſe 4 ſorts, he would make another ſort, that ſhould be but of 6 ounces fine. The queſtion is to know what portion he muſt take of every of the ſaid Billons? Anſw. Set downe the particular fineneſſe, the one under the other; namely, 3, 5, 8, & 10, and ſet 6 which is the common fineneſſe, before them toward your left hand, as here you may ſee.

Then put the difference of 3 from 6 right against 10, and the difference of 6 from 10, which is 4, right against 3. Likewise the difference of 5 from 6 which is 1, right against 8, and the difference of 6 from 8, which is 2, right against 5. This done, you shall conclude, that for every 4 pound weight that he taketh of the Billon of 3 ounces fine, he must take 2 pound of the Billion of 5 ounces fine, and 1 li. weight of the Billion of 8 ounces fine, and 3 li. weight of that which is of 10 ounces fine. Or else if you please adde 4, 2, 1, and 3 together and they make 10, which shall be the denominator of every of the portions, that is to say, you shall take $\frac{4}{10}$ of the Billion of 3 ounces fine $\frac{2}{10}$ of that which is of 5 oun. fine, $\frac{1}{10}$ of that of 8 ounces fine, & $\frac{3}{10}$ of that which is of 10 ounces fine. And so of all such like. And if you would make 60 pound weight of such a mixture, you must adde 4, 2, 1, & 3, together, which maketh 10, & then worke by the Rule of Company, saying, if 10 li. give 60 li. what will 4 give? and so

so likewise, what will 2 give, &c. This forme may be varied, by combining the particular values after this manner as here you doe see, and as in the other example, it is plaine.

4. Sometimes the value doth change his difference, and is linked unto divers, for to represent the portion that is to be taken of every thing, as by example: A Merchant hath Wheat of 2 s. 8 d. the bushel, Rie of 2 s. and Barley of 16 d. the bushel, and he will make a mixture of these sorts which shall stand him but in 22 d. the bushel. It is demanded how much he may take of every sort of the said graine? Answ. Put the difference of 22 from 32 and 24 right against the 16. And likewise the difference of 16 from 22 right against 32 and against 24: And you shall finde for 6 bushels that he taketh of Wheat, he must take 6 bushels of Rie, and 12 bushels of Barley.

d.

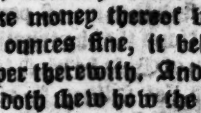
$$22\left\{\begin{array}{l} 32 \text{———} 6 \\ 24 \text{———} 6 \\ \hline 16 \text{———} 10, \text{ \& } 2, \text{ or } 12. \end{array}\right.$$

5. A Mint-master hath Billion of 9 ounc. 10 peny weight fine, and of the same he would make money, which should be but of 6 ounces fine, and therefore it behoveth him to melt copper therewith, which is valued at 0 peny weight of fine. The question is to know how much silver and copper he must mixe together? After that you have put downe 9 ounce, $\frac{1}{2}$ for the value of the silver, and right under the same 0 for the copper, you must take the difference of 6 from $9\frac{1}{2}$ which is $3\frac{1}{2}$ and place the same sum right against the 0, for to signifie the portion of copper that he must take: And the difference of 0 from 6 is 6: the same you must set right against $9\frac{1}{2}$, which shall represent the portion of silver that he must take. And thus you see that for 6 pound of silver that he taketh he must take 3 pound $\frac{1}{2}$ of copper to make the said money of 6 ounces fine.

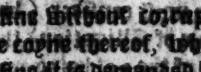
$$6\left\{\begin{array}{l} 9\frac{1}{2} \\ 0 \end{array}\right. \quad \left\{\begin{array}{l} 6 \text{ li. sil.} \\ 3 \text{ li. } \frac{1}{2} \text{ cop.} \end{array}\right.$$

And

And if he had 3 sorts of Silver Billion, that is to say, of 6 ounces fine, of 7 ounces fine, and of 9 ounces fine, and he would make money thereof which should be but of 5 ounces fine, it behoveth him to mixe copper therewith. And this sorme following doth shew how the same must be combined, and likewise how much he must take of every sort.



6. Likewise, a Spint-maker hath Billion of Gold, at 19 Karets fine, some at 22 Karets fine, some at 24 Karets which is full fine without corruption, and he will make coyne thereof, which shall be 23 Karets fine, it is demanded how much he must take of every sort? Answ. make your Alligation as this sorm here under sheweth:

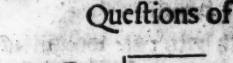


Note, the said Spatter hath Gold of 20 Karets $\frac{1}{2}$ fine, and of 22 Karets fine, and he will allay the same to 18 Karets fine. And

for to doe the same, it is convenient for him to mix Silver therewith, which is esteemed at 0 Karets fine, but proceeding according to this Rule, he shal find that for 18 pound weight, or other portions that he taketh of the 2 sorts of Billion of Gold, he must take 6 pound weight and $\frac{1}{2}$ of Silver to allay the same unto 18 Karets fine.

$$18\left\{\begin{array}{l} 20\frac{1}{2} \text{ — } 18 \\ 22 \text{ — } 18 \\ 0 \text{ — } 2\frac{1}{2}\ 4, \text{ that is } 6\frac{1}{2} \end{array}\right.$$

7. Againe, the said Master hath 100 li. weight of Gold at 22 Karets fine, and 20 pound weight at 19 Karets fine, the which he will allay to 20 Karets fine. The question is, whether he ought to mix any Silver with the same, yea or no, and how much? Answ. You must consider (by the first part of the Rule of Alligation) the allay of the 100 l. and of the 20 l. being melted together, and you shall find that the same is of $21\frac{1}{2}$ Karets fine, and therefore forasmuch as the same is yet of a better finenesse than he would have it) he must therefore mix Silver therewith, that is to say, for 20 li. weight, or portions of Gold he must take thereto 1 li. $\frac{1}{2}$ of Silver.



8. If he had 1 li. weight fine Silver of 12 ounces fine, I demand how much Copper he muſt mix with the ſame, to allay it unto 11 ounces 1/4 fine, that is to ſay, to 11 ounces 5 d. weight fine? Make your Alligation as before is taught. Then divide the portion of Copper, by the portion of fine, and you ſhall find 1/45, which being abbreviated, is 1/15. And thus to every li. weight of Silver, you muſt take 1/15 of a li. of Copper, and for every 11 pound 1/4 of Silver, you muſt take 1/4 of a li. of Copper. And ſo is to be done with the ſame, in caſe that it were of any other allay.

9. A Matter hath 1 l. of fine Gold of 24 Karets fine, the which he would allay to 22 Karets fine. The queſtion is to know how much Silver muſt be mixed with the ſame, that it may be of the fineneſſe of 22 Karets as before? Anſw. Take the difference of 22 to 24, which is 2, then divide 2 by 22, which you cannot, for they are 2/22, but abbreviate them, and it is 1/11. And ſo much Silver muſt be mixed with 1 li. weight of fine gold that the ſame may be of 22 Karets fine.

10. A Gold-smith hath 1 lt. weight of Silver Billon of 7 ounces fine, it is demanded how much fine Silver he must put to the same, that being molten together, it may be of 10 ounces fine? Answ. make your alligation of 7, and 12 unto 10, and then divide the portion of the fine silver, by the portion of silver Billon, and you shall find 1 $\frac{1}{2}$: and thus to 1 lt. weight of 7 ounces fine, you must take 1 lt. $\frac{1}{2}$ of fine silver of 12 ounces fine to make the same of 10 ounces fine.

11. A Merchant hath given order unto his Factor to employ him 83 lt. 6 s. 8 d. ster. in 5 sorts of spices, that is to say, in Nutmegs of 80 pence the pound, Cloves at 76 pence the pound, Cinamon at 52 pence the pound, Ginger at 34 pence the pound, and Pepper at 30 pence the pound. But he hath not appointed him the quantity or portion which he should buy of every sort, neither yet of all the sorts together: the question is to know how much the Factor must buy of every sort to have of each the like quantity? Answ. You must adde 80, 76, 52, 34, and 30, together, and they make 272. Then must you divide 83 lt. 6 sh. 8 d. being reduced into pence, namely 20000 pence by 272, and thereof cometh

73 li. $\frac{2}{17}$, and so many pounds must be buy of every sort of the said spices.

12. But in case he would not have so many pounds of the one sort, as he would have of the other, then you must take another middle value between the said particulars: As for example, let the meane number be 50 pence; then reduce the said 83 li. 6 shil. 8 d. into pence as the other prices are, and they doe make 2000 pence, the same you must divide by 50 pence, which is the meane or common price, and thereof will come 400 pounds. And so many pounds must he have of all the sorts together. Then if you will know how many pounds he must have of every sort, you must set downe your particular prices, after the middle value, that is to say, after 50 pence, as hereafter followeth: And then worke by the Rule of Company, and you shall finde how much he shall buy of every sort.

110

110 give 400, what { 20? Anſ. 72 $\frac{8}{11}$ / 16? Anſ. 58 $\frac{2}{11}$ / 16? Anſ. 58 $\frac{2}{11}$ / 28? Anſ. 101 $\frac{9}{11}$ / 30? Anſ 109 $\frac{1}{11}$

400

Chap. 14.

Of the Rule of Falſhood, or falſe Poſitions.

THe Rule of Falſhood is ſo named not for that it teacheth any deceit or falſhood, but that by falſed numbers taken at all adventures, it teacheth to find out the true number that is demanded. And this (of all the vulgar rules which are in practiſe) is the moſt excellent: This Rule hath two parts, the one is of one falſe poſition alone; the other is of two poſitions, as hereafter ſhall appeare.

Thoſe

Those questions which are done by false positions, have their operations, in a manner like unto that of the Rule of Three: but onely that in the Rule of Three, we have three numbers knowne, and here in this Rule, we have but 1 number that cometh in use to worke by: unto the likenesse whereof, we must devise two other numbers, the one multiplying, and the other dividing, as by example.

1. I have delivered to a banker, a certain summe of pounds in money, to have of him by the year simply 6 li. upon the 100 li. And at the end of 10 years, he paid me 500 pound for all, both principall and gaine. I demand how much was the principall summe that I delivered him at the first? Here you see that there are divers termes: but the chiefe to worke withall is 500 li. which cometh of the other numbers, that is to say, of 10, and 100, for of them is composed or made the tenor of the question, the practise whereof is thus:

Let us faine a number at pleasure, and with the same let us make our discourse, even as though it were the principall summe that we seek for. As by example. Suppose that I delivered him at the first 200 li. the which were worth to mee in tenne

yeares

peares 120 li. after the rate of 6 li. upon the 100 li. Then 120 li. added with 200 l. doe make but 320 li. and I must have 500 li. Thus you see that I have three termes of the Rule of Three: the one which shall contain the Question, the other two which I have formed artificially, which are 200 & 320: in such sort, that 320 ought to have such proportion to 200, as 500 hath unto the number that I seeke: that is to say, unto the true principall summe, then must I have recourse unto the Rule of Three, after this sort, saying: If 320 l. become of 200 l. of how much shall come 500 l. I doe multiply 500 by 200, and they are 10000, the which I must divide by 320 li. and thereof cometh 312 l. ½ which is the summe that I delivered at the first. And thus this Rule hath some congruence with the double Rule of Three.

2. I have a Cisterne with 3 unequall cocks, containing 60 pipes of water: And if the greatest cock be opened, that water will void cleane in one houer, at the second it will avoid in two houers, and at the third it will require three houers: now I demand in what space it will avoid, all the cocks being set open? Answ. Suppose that it will avoid in halfe an houer: that

is

as to say, in 30 minutes. Then must there avoid at the first cock the $\frac{1}{2}$, which is 30 pipes: and by the second cock the $\frac{1}{4}$, which is 15 pipes; and by the third cock the $\frac{1}{6}$ that is 10 pipes: all the which summes being added together, doe make 55 pipes: but it should be 60 pipes. Therefore say by the Rule of Three, if 55 pipes doe void in 30 minuts: in how many minuts will 60 pipes void? Multiply and divide, and you shall finde 32 minutes $\frac{40}{55}$, the which $\frac{40}{55}$ being abbreviated $\frac{8}{11}$ of a minute, and in that space will the water void, if all the cocks be set open.

Of the Rule of two false Positions.

The summe of this Rule of two false Positions is thus, when any Question is proposed appertaining to this Rule, first you must imagine any number at your pleasure, which you shall name the first position, and with the same you shall worke in stead of the true number, as the question doth import: and if you see that you have missed of the true number that you do seek, then is the last number of the worke, either too great or too little; the which number, you shall note with the signe of more or lesse, for that is the first error, in the which

you

you have failed, the which signes of more, and lesse, shall be noted with these figures X, —, This figure X, betokeneth more: and this plaine line —, signifieth lesse: that is to say, the one signifieth too much, and the other too little: then you must begin againe, and take another number, which shall be the second position, and worke by the question as before: if you have failed again, note the excesse or want, for that is the second error. Then shall you multiply the first position by the second error crosse-wise, and againe the second position by the first error (and this must alwaies be observed) and you must keep the two products: then if the signs be both alike, that is to say, either both too much, or both too little, you shall abate the lesser product from the greater, and likewise you shall subtract the lesser error from the greater, and by the remaine of those errors, you shall divide the residue of the products, the quotient shall be the true number that you seek. But if the 2 signes be unlike, that is to say, the one too much, and the other too little, then you shall adde those products together, and likewise you must adde both the errors together, and by the summe of those errors, divide the totall sum of both the products: the quotient shall

shall be the true number that you doe seek, and this is the whole Rule, as by these examples following, it will appeare more plaine.

Example.

3 A man lying at the point of death said that he had in a certaine Coffer 100 Duckets, the which he bequeathed to 3 of his friends by him named, after this sort: The first must have a certain portion: The second must have twice so many as the first abating 8 Duckets: And the third must have three times so many as the first lesse by 15 Duckets. Now I demand how many every of them must have? Answer. First I doe imagine that the first man had 30 Duckets, then by the order of the question, the second should have 52, & the third 75. These three summes being added together do make 157, and I should have but 100, so that this first error is too much by 57, then I note apart the first position 30, with his error 57 too much after this sort 30. 57. Therefore I prosecute my worke, & I suppose that the first had 24, then by the order of the question, the second should have 40, and the third 57: these three summes being added together, doe make 121, and I must have but 100, so the second error is too much by

by 21. Therefore I note 24 X 21, under the 30 X 57, which was my first position with the error, as you may see in the Example following.

Then I multiply crosswise, 30, (which is the first position) by 21 which is the second error, and thereof cometh 630. Likewise I multiply 24, (which is the second position) by 57, which is the first error, and I finde 1368: Then because the signes of the errors are both like, that is to say both too much, I must therefore subtract 630 from 1368 and there will remain 738 which is the dividend.

630.
30. X 57
X
24 X 21.
1368. 36.
630.
738.

Again I must subtract the lesser error from the greater, that is to say, 21, out of 57, and there will remaine 36, which shall be my divisor. This done I divide 738, by 36, and the quotient will be 20, ½.

20 ½.	21
33.	738
46 ½.	366. (20 ½
190.	3

The

The which 20 ½, is the just number of the Duckets, that the first man had for his part, so consequently the second man had 33 Duckets, and the third 46 ½, as by the working before may appeare.

The like number will also appear in case the errors were both too little, as in making the two positions by 28 & 20, and you shall finde that the two errors will be both too little, the first will be too little by 15, and the second too little by three, as by perusing this work, you shall well perceive.

54.
18.-15
X
20.- 3.
300.12
54.
240. | 246 (20½
122
2

Againe, if one of the errors were too much, and the other too little, yet you shall have the true number, as before. As if the two positions were 24, and 20, you shall finde that the first error will be 21 too much, and the second will be 3 too little. Therefore multiply 24 by 3 crosseville, cometh 72.

Likewise multiply 20 by 21, the product will be 420. These two summes 72 and

420,

420, you shall adde together, for because the signes of the errors be unlike, and they make 492, the which shall be your dividend, and again, add the lesser error 3, with the greater error 21, & they make 24, for your divisor, then divide 492 by 24, the quotient will be $20\frac{1}{2}$: as before doth plainly appeare.

72

24 X 21

X

20 — 3

420 24

72

492 | 1 | 492 | 244 | 2

And now because you shall not forget this part of the Rule, learne this briefe remembrance following.

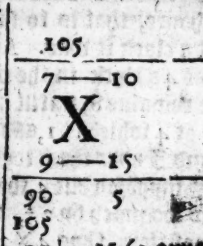
The signs both like, Substraction doth require;
And unlike signs, Addition will desire.

The meaning whereof is thus, if both the errors have like signes, then must the Dividend and the Divisor be made by substraction as is taught before, and if those signes be unlike, then must you by Addition gather the Dividend, and the Divisor, as I have done in this last example.

Another

Another Example.

4. A man hath two silver Cups of unequall weight, having to them both but one cover, the weight whereof is 5 ounc. if the cover be put to the lesser cup, it will be in double proportion unto the weight of the greater, and the cover being put to the greater cup, it will be in triple proportion unto the weight of the lesser. I demand what was the weight of every cup? Answ. Suppose that the lesser Cup did weigh 7 ounces, then with the cover it must weigh 12 ounces, and this weight should be in double proportion unto the greater, therefore the greatest must weigh but 6 ounc. adde unto it 5 ounc. for the cover, all will be, 11 ounc. but it should be 21, for to have it in triple proportion unto 7, which doth represent the weight of the lesser cup: So that this first errour is too little by 10, which you shall note after 7 in this sort, 7, ——— 10.



After you shall suppose some other number, as 9, and make the like worke as before, so you shall finde 15 too little for the second error, which you shall put behinde 9 with the signe lesse thus ——15, and then worke with the rest as above is said, and you shall finde that the lesser Cup weighed three ounces, and consequently the greater foure ounces.

5. One man demanded of another in a morning what a clock it was? The other made him this answer, if you do adde (saith he) the $\frac{1}{4}$ of the houres which be past since midnight with the $\frac{1}{3}$ of the houres which are to come untill noone, you shall have the just houre, that is to say, you shall know what a clock it was. Answ. Suppose that it was 4 a clock in the morning, so should there remaine 8, untill noone, then I take the $\frac{1}{4}$ of 4 which is 1, and the $\frac{1}{3}$ of 8 which is $5\frac{1}{3}$ and I adde them together, so I find $6\frac{1}{3}$, and I supposed but 4, therefore this first error is too much by $2\frac{1}{3}$, which I note after my position, thus $4 \times 2\frac{1}{3}$: then againe I suppose another number, that is to say 9, so should remaine but 3 houres untill noone. I take the $\frac{1}{4}$ of 9, and the $\frac{1}{3}$ of 3, which is $2\frac{1}{4}$ and 1: these I adde together, and they make $4\frac{1}{4}$: but I supposed that it was 9, therefore

the

the second error is $4\frac{1}{4}$ too little, which I note behind my position thus: $9-\frac{1}{4}$.

And then I multiply crosse-wise, as before is taught, and because the signes of the errors are unlike, that is to say, the one too much, and the other too little, therefore in this worke I must adde the products, and they will be 40. Likewise I must adde the errors and they be $7\frac{1}{12}$. Then I divide 40 by $7\frac{1}{3}$, and thereof cometh 5 houres $\frac{11}{17}$, and that houre it was in the morning.

19.
$4 \times 2\frac{1}{3}$.
X
$9-4\frac{1}{4}$.
21. $7\frac{1}{12}$.
19.
40.

Chap. 15.

Of divers Questions extraordinary, every one of them containing a generall Rule for such like Examples.

Five men debating of their ages: the first said to the others, that he was 120 years of age: the 2d said, if my yeares were doubled then should I have so many yeares more than the first

man, as the first hath now more than I have: The third said in like manner, if my yeares were tripled. The fourth said if my yeares were quadrupled, that is to say, multiplied by 4: The fift said that if his yeares were quintupled, that is to say, multiplied by 5, that they should each of them have so many yeares more than the first man as he hath now more than every one of them. The Question is to know, how old every one of the other 4 men were? Answ. You must take the numbers which are nearest collaterals, in naturall order unto 2, 3, 4, and 5, by reason of dupling, tripling, &c. And the greater of every of the said numbers collaterals, must be your Denominator to the lesser number. As thus, the next collaterall numbers unto 2, are 1, and 3, which is $\frac{1}{3}$. Likewise the next collaterall numbers to 3 are 2 and 4, which is $\frac{2}{4}$. And so for 4, are 3 and 5, which are $\frac{3}{5}$, and for 5 are 4, and 6 which be $\frac{4}{5}$. Then if you would know the second mans age, you must adde unto 120 the $\frac{1}{3}$ of it selfe which is 40, all is 160, the same you must divide by 2, and thereof cometh 80 yeares, and so old was the second man. And for to know the age of the third man, you must adde unto 120 his owne $\frac{2}{4}$ that is

to

to say, his $\frac{1}{2}$, which is 60, and they make 180. The said summe you must divide by 3, and thereof cometh 60 years for the third mans age. And after the same manner, you shall finde that the fourth man had 48 years, and the fift had 40 years. The proof is very easie.

2. A man having his eye-sight somwhat altered, began to tell and reckon a certaine number of Birds to be in all 18. His Companion that had a clearer sight, beholding well the Birds: Answered him that there were not 18. But said he, if there were twise so many more as there are, there should be as many more above 18 as there are now lesse than 18. The question is to know, how many birds there were in all? Ans. You must adde unto 18 his $\frac{2}{3}$, that is to say his $\frac{1}{2}$, & thereof will come 27, the which you shall divide by 3, and thereof cometh 9. And so many Birds there were in all.

3. A Draper hath bought 24 sorting cloathes, and hee hath sold 100 pounds worth of the same cloaths, upon the which he hath gained, as much as 1 Cloth did cost him. I demand what one of the said cloathes did cost him? Answ. You must adde 1 unto 24, and they make 25. Then divide 100 by 25, and thereof will come

4 li. and so much did one cloth cost him.

4. A Spaid carried Eggs unto the market, and it happened a merry Fellow to meet her, who began to jest with her in such sort, that he overthrew her basket, and brake all her Egges, the Spaid being much displeased with him for breaking of the same, said very earnestly unto him, that he should pay for them: the Spaw considering with himself, that by his folly they were broken, answered the Spaid that he would pay her for them, and therefore he demanded of her what number she had? The silly poor Wench that could not wel reckon, said unto him, that she could not well tell him, but said she, when I did put them into my Basket by 2 and by 2, there remained 1 Egge: and when I counted them by 3 and by 3, there remained 1: and when I did reckon them by 4 and by 4, there remained still 1: but when I did count them by 5 and by 5, there remained none. The question is to know how many Egges the Spaid had in all? Answ. For to doe this, and all such like questions, you must multiply 2, 3, and 4, together; saying, 2 times 3 make 6, and 6 times 4 make 24, unto this number you must adde 1, and they make 25. And so many Egges she had in all. But if

she

she had had a greater number of Eggs that she might have counted them till she came to 7 & 7, after the same manner as she did, till she came to 5 and 5, you must multiply these numbers 2, 3, 4, 5, and 6, the one by the other, and thereof will come 720, unto the which adde 1, and they make 721. And so many Egges she should have had, if she had counted them by 7 and 7.

5. Againe, if she had said, that when she counted her Egges by 2, and by 2 there remained 1, and by 3 and 3, there remained 2, and by 4 and 4, there remained 3, and by 5 and 5, there remained nothing. The Question is to know, how many Egges she should have had? Answer. You must finde a number the least that you can possible, which may be divided by 2, by 3, and by 4, that is to say, 12 is the nearest number, divide the same by 5, and there remaineth 2. This being done you must finde two numbers, the least that is possible, which may be divided by 5, and by 2, in such sort that the number which is divided by 2 may exceed (the other that is divided by 5) onely by 1, and those 2 numbers are 10, and 6, for if you divide 6 by 2, your quotient will be 3, and 10 divided by 5, bringeth but 2:

then consider, that 6 containeth 3 times 2, and therefore you must multiply 12 by 3, and they make 36, from the which you must substract 1, and there will remaine 35, which is the number that is required to be found.

6. And if she had counted them after the same manner unto 7, and that there had remained nothing; then you know that 60 is the neerest number that may be divided by 2, 3, 4, 5, and 6, the which 60 being divided by 7, there will remain 4, & therefore you must find 2 numbers the least that may be, that can be divided by 4, & by 7, in such sort, that that number which is divided by 4, may exceed the other number (by 1) that is divided by 7, the which 2 numbers are 7, and 8, for if you divide 8 by 4, your quotient will be 2. And dividing 7 by 7, your quotient will be 1, and therefore for because that containeth 2 times 4, you must multiply 60 by 2, and thereof cometh 120, from the which number you shall substract 1, and the residue which are 119, is the number that is required.

7. A Thiefe entring into a Garden, did steale from thence a certaine number of Apples: And at his comming forth, he did meet with Three men, one after another

another, who threatned to accuse him: and for to appease them, he gave unto the first the $\frac{1}{2}$ of all his Apples, who received the same with thanks, but he returned him 12 of them back again. Then he gave unto the second the $\frac{1}{3}$ of them that he had remaining, who received the same, but he gave him back again 7 apples: & so he gave unto the third man, the $\frac{1}{4}$ of the residue, who returned him 4. And in the end he had still remaining 20 Apples. The question is to know, how many Apples he gathered in the said Garden? Answ. For to doe this, you shal substract 4 from 20, and there will remaine 16, the same you shall double, and they make 32: from the which you must abate 7, and there will remaine 25: the same you shall double, and they make 50: from the which you shall substract 12, and there will remaine 38, whereof the double which is 76, doth shew the numer of Apples that he gathered. This and such like questions are easie to be done in going backwards from the end of the question untill you come to the beginning thereof. But if he had given the $\frac{1}{3}$ unto one of them, the $\frac{1}{2}$ unto another, and $\frac{1}{4}$ unto the last, or any other, all the same may be done by the Converse Rule, that is to say,

begin-

beginning at the end of the Question, till you come to the beginning as before is said.

8. A Merchant did ride unto three several Faires: at the first he doubled his money and spent 10 Crownes: at the second Faire he did also double his money and spent 10 Crownes: And likewise at the third Faire, he did double his money and spent 10 Crownes, and in the end, he found that he had remaining but 2 Crowns. The Question is to know, how many Crowns he had at the first? Answ. For to doe this, you must adde unto 10 Crownes, the 2 Crowns which he had remaining, and they make 12, whereof you shall take the ½, which is 6: againe adde 6 unto 10, and they make 16, whereof you shall take the ½ which is 8: Finally, you shall adde 8 unto 10, and they make 18, whereof you must take the ½ which is 9: and so he had 9 Crownes at the first.

9. A Burgesse would distribute a certaine Summe of Pence unto divers poore men equally: but after that he had counted how many there were in number, he perceived that if he should give unto every man 6 d. he should want 14 d. But if he should give every man 5 d. the piece, he should have

9 V.

9 d. remaining. The question is to know the number of the poore men. Answ. For to doe this, and such like questions, you must have in remembrance this principle, more from more, or lesse from lesse, &c. which is first put in two Verses in the Rule of false positions, that is to say, you must alwe the lesse with the more; Namely, 14 with 9, and they make 23: and divide the same sum by the difference which is of 5 from 6 that is 1. And therefore you must divide 23 by 1, but 1 doth neither multiply nor divide, therefore you may conclude, and say that there were 23 poore men.

10. And if he should give to every man 5 pence, he should have 19 pence remaining, and giving every man 7 d. he should have 3 pence over. In this case you must abate more from more, that is to say, 3 from 19 and the rest which is 16 you must divide by 2 which is the difference of 5 from 7: and the quotient which is 8, doth shew you the number of the poore men: and likewise if that he had two both wants, that is, if both the numbers had been too little, you must have done with them as you did with the others that were both more.

11. A man hath given unto 20 Children 20 shillings, that is to say, unto men, women,

women, and boyes: unto men he gave 20 d. a peece, unto women 15 d. and unto boyes he gave 8 d. The question is to know, how many men, how many women, and how many boyes there were in all? Answ. First you must take the difference of 8 from 15, and also from 20: and you shall have 7 for the difference of the woman, and 12 for that of the man: this done, you may suppose that there were 20 boyes, the which at 8 d. the peece maketh 160: the which you must abate from 20 shil. being reduced into pence, that is, from 240 pence, and there will remaine 80 pence, the which 80 you shall divide into 2 such parts that the one may be divided by 7, and the other by 12, and that nothing may remaine after the divisions are made. The which 2 numbers are 56, and 24: For 56 being divided by 7, bringeth into the quotient 8, and 24 being divided by 12, will bring into the quotient 2: which sheweth that there was 8 women, 2 men, and the rest of the 20, which are 10, were boyes, so there were 8 women, 2 men, and 10 boyes. Some men doe call this Rule, the Virgins Rule.

Chap.

Chap. 16.
Of Sports and Paſtime, done by Number.

IF you would know that number that any man doth thinke, or imagine in his minde as though you could divine: Bid him triple the ſame number, then of the product let him take the $\frac{1}{2}$, if the number be even, or elſe the greater halfe, if the ſame be odde, then bid him triple againe the ſaid $\frac{1}{2}$: after ſay to him, that he ſhall put away if he can 36, 27, or 9, from the laſt number being tripled: that is to ſay, cauſe him ſubtilly to put away 9, as many times as is poſſible, and keep the number ſecretly: and when he can no more take away 9: then to know if that yet there remaine any number, bid him abate 3, 2, or 1, if he can: this done, ſee how many times 9 you have cauſed him to abate, for the which keep you in minde ſo many times 2, and if that you know that he had any thing remaining beſides the nines, the ſame ſhall note unto you 1.

Example.

Example.

Suppose that he thought 6, which being tripled is 18, whereof the ½ is 9, the triple of that is 27: now cause him to abate 18, or 9, or 27: and againe 9 but then he will say unto you that he cannot; bid him then abate 3, or 2, or 1; he will say also that he cannot; wherefore considering that you have made him to abate 3 times 9 justly, you shall tell him that he thought 6, for 3 times 2 maketh 6. If he had thought 5, the triple thereof is 15, whereof the greater ½ is 8, the triple of that maketh 24, which containeth 2 times 9, they are worth 4 and the remaine signifieth 1, the which added together make 5 which is the number that he thought.

2. If in any company, one of them hath a Ring upon his finger, & you would know by manner of dividing who hath the same, and upon what finger and what joynt: cause the persons to sit down in order, and keep likewise an order of 3 fingers: then separate your selfe from them in some certain place, and say unto one of the Lookers on, that he double the number (marking well in your minde the order) of him that hath the Ring: and unto the double bid him adde 5, and then cause him to multiply this

this addition by 5, and unto the product bid him adde the number of the finger of the person which hath the Ring: Suppose that the same last sum did amount to 89, then afterward say to him, that he put after the same last number toward his right hand, a figure signifying upon which of the joynts he hath the Ring, as if it be upon the third joynt, let him put 3 after 89, and it will be 893, this done, you shall aske him what number he keepeth, from the which you shall abate 250, and you shal have 3 figures remaining at the least. The first toward your left hand shall signifie the number of the person which hath the Ring. The second or middle figure shall represent the number of the finger. And the last figure toward your right hand, shall betoken the number of the joynt. As if the number which he did keep were 883, from that you shall abate 250, and there will remain 643, which doe note unto you, that the first person hath the Ring upon the 4 finger, and upon his third joynt.

But note, that when you have made your subtraction, if there doe remaine a Cipher in the place of Tens, that is to say, in the second place, you must then abate 1 from that figure which is in the

place

place of hundreds, that is to say, from the figure which is next your left hand, and that shall be worth 10 tenths, signifying the tenth finger: as if there should remain 703, you must say, that the first person (upon his tenth finger, and upon his third joynt) hath the Ring.

3. And after the same manner, if a man doe cast three Dice, you may know the points of every one of them, for if you doe cause him to double the points of one Dye, and unto the double to adde 5, and the same summe to multiply by 5, and unto the product adde the points of one of the other Dice, and behinde that number toward the right hand, to put the figure which signifieth the points of the last Dye, and then shall you ask him what number he keepeth, from the which abate 250, and there will remain 3 figures: which doe note unto you the points of every Dye.

4. Likewise, if 3 of your Companions, to say, Peter, James, & John, would (in your absence) give themselves every one a contrary name? as for example: Peter would be called a King, James a Duke, and John a County: And you would divine which of them is called a King, which the Duke, and which the County: take 24 stones, or other peeces

pieces whatsoever and give unto Peter 1, unto James 2, and unto John 3, or otherwise. But marke well unto which of them you have given 1, unto which 2, and unto whom 3. Then leaving the 18 stones (before them) that are remaining, you shall absent your self from their sight, or else turne your face from them, saying thus unto them: whosoever nameth himself a King, for every stone that I gave him, let him take 8 of the residue; and he that nameth himselfe a Duke, for every stone that I gave him, let him take 2 of them that remaine, and he that calleth himselfe a County, for every stone that I gave him, let him take 4: this being done, approach neare them, and mark how many stones are remaining: and know this, that there cannot remaine any other number, but one of the six, 1, 2, 3, 5 6, 7, for the which six numbers we have chosen to every of them a severall neme which are these: *Angeli*, *Beati*, *Taliter*, *Messias*, *Israel*, *Pietas*: each of them containing 3 vowels a, e, i, which doe shew the names by order: That is to say, the vowell a

sheweth which is the King; the vowell e, telleth which is the Duke; and the vowell i, sheweth which is the County: in following the order how, and to whom you have given 1 stone, to whom 2, and to which 3, then if there doe remaine but 1 stone, the first name *Angeli*, (by these 3 vowels a, e, i,) sheweth that Peter is King, James the Duke, and John the County. And if there doe remaine 2 stones, the second name *Beati*, shall shew you by these 3 vowels a, e, i, that Peter is the Duke, James the King, and John the County. And so of the other, as by this Table doth plainly appeare.

1,	2,	1,	2,	3,	3,	
2,	1,	3,	3,	1,	2,	
3,	3,	2,	1,	2,	1,	
a,	e,	a,	e,	i,	i,	
e,	a,	i,	i,	a,	e,	
i,	i,	e,	a,	e,	a,	
1,	2,	3,	4,	5,	6,	7,
A.	*B.*	*T.*	*M.*	*I.*	*P.*	

FINIS.

In the enſuing Tables, the figures towards the left hand of the line doe ſhew the number of Elles, Aulns, Mares, Brates or Paulms, which are equall to the 100 Elles, Aulns, Mares, Brates, or Paulms of the place named, over the head of the Table: And the figures to the right hand of the line doe ſhew the fractionary part, and ſo are all numerators of fractions, whoſe common denomination is 1000. So that in this Decimall way of accompt 750 is 3 quarters of an Ell, Aulne, Mare, &c. 500 is halfe an Ell, 250 is a quarter, and 175 is halfe a quarter, &c.

Example; at Lions the 100 Aulnes makes at Antwerp 163 Elles and 934 parts of an Ell devided into 1000 parts, ſubſtract from 934, 750, which is 3 quarters, and the remaine 184 which is leſſe then a quarter, therefore take from it 175 which is halfe a quarter, and there remains 009 as much as nothing: therefore the 100 Aulnes at Lions makes at Antwerp 163 Elles 3 quarters, and halfe quarter the like of any other.

As in the ensuing Tables the Ell is divided into 1000 to the pound is divided into the like parts, and therefore 750 in the fraction is 3 quarters of a pound or 12 ounces, 500 is halfe a pound or 8 ounces, 250 is a quarter or 4 ounces, and 175 is halfe a quarter or 2 ounces: But the way to value these equall fractions into ounces is by multiplying the numerator of the fraction by 16, and cut off 3 figures to the right hand, that which remaines to the left hand is ounc. Example, 100 li. of Lions makes at Antwerp 90 li. 823 parts of a pound which 823 multiplied by 16 the product is 13. 168, from which cut off three figures to the right hand; there remains 13 ounces: Or seek the number 823 (or the neerest to it, lesse if it cannot be found) and against it to the right hand you shall find 13 ounces as before, and the like of any other number.

15	937 5
14	875 0
13	812.5
12	750.0
11	687.5
10	625.0
9	562.5
8	500.0
7	437.5
6	375 0
5	312.5
4	250.0
3	187.5
2	125.0
1	62.5

The

The Agreement of the Measures and Waights of divers Countries, the one with the other, being reduced to an equality, and drawn into Tables, as followeth.

London.

100 Ells at London doe make at			
Antwerp,	166	667	Elles.
Nuremberg,	174	167	
Franckford,	203	333	
Dantzick,	138	333	
Vienna,	145	000	
Arras,	165		
Lions,	101	667	Aulnes.
Paris,	95	000	
Roan,	86	667	
Stroill,	135	000	Mares.
The Iles of Maderes,	103	333	
Venice,	108	000	Braces.
Lucques,	200	000	
Florence,	204	167	
Millan,	230	000	
Genoa,	480	833	Paulms

The *Vares* of *Lisbourn* is equall to the Ell of *London*.

Antwerp.

100 Ells at Antwerp do make at

London,	60	Elles,
Nuremberg,	104	500
Frankford,	125	000
Dantzick,	83	000
Vienna,	87	200
Arras,	99	000
Lions,	61	Aulnes.
Paris,	57	000
Rean,	52	
Stoill,	81	Vares.
The Iles,	62	
Venice,	108	Vzaces.
Lucques,	120	
Florence,	122	5
Millan,	138	
Genoa,	288	5. Paulmes.

Nuremberg.

Nuremberg.

100 Ells at Nuremberg do make at

London,	57	416	Ells.
Antwerp,	95	694	
Franckford,	119	617	
Dantzick,	79	414	
Vienna,	83	253	
Arras,	94	736	
Lions,	58	373	Aulns.
Paris,	54	545	
Roan,	49	760	
Sivill,	77	506	Vares.
The Iles,	59	330	
Venice,	103	292	Braces
Lucques,	114	832	
Florence,	117	225	
Millan,	132	057	
Genoa.	276	076	Paulms

Franckford.

100 Ells at Franckford do make at

London,	48	000	Elles,
Antwerp.	80	000	
Nuremberg,	83	648	
Dantzick,	64	400	
Vienna,	69	600	
Arras,	79	200	
Lions,	48	8	Aulnes.
Paris,	45	600	
Roan,	41	600	
Sivill,	64	8	Mares.
The Iles,	49	600	
Venice,	86	4	Braces
Lucques,	96	000	
Florence,	98	000	
Millan,	110	440	
Genoa,	230	8	Paulmes.

The Ell at *Liebsig* and *Preslau* is equall unto the Ell at *Franckford*.

Dantzick.

100 Ells at Dantzick do make at			
London,	72	289	Ells.
Antwerp,	120	482	
Nuremberg,	125	903	
Franckford,	1 0	602	
Vienna,	104	819	
Arras,	112	0,8	
Lions,	73	494	Aulnes.
Paris,	68	(02	
Roan,	62	650	
Sivill,	97	590	Vares.
The Iles,	74	699	
Venice,	130	120	Braces.
Lucques,	144	578	
Florence,	147	590	
Millan,	166	265	
Genoa,	347	590	Paulms.

Vienna.

100 Ells at Vienna do make at

London,	68	965 Ells.
Antwerp,	114	942
Nuremberg,	130	114
Franckford,	143	678
Dantzick,	95	402
Arras,	113	793
Lions,	70	011 Aulnes.
Paris,	65	517
Roan,	59	765
Seville,	93	103 Vares.
The Iles,	71	264
Venice,	124	138 Braces.
Lucques,	137	930
Florence,	140	108
Millan,	158	620
Genoa,	331	601 Paulms

100 Ells at Arras doe make at

Arras.

100 Ells at Arras doe make at

London,	60	606 Ells.
Antwerp,	101	010
Nuremberg,	105	555
Franckford,	126	262
Dantzick,	83	838
Vienna,	87	878
Lions,	61	616 Aulnes.
Paris,	57	575
Roan,	52	525
Sivill,	80	180 Yares.
The Iles,	62	626
Venice,	109	090 Braces.
Lucques,	121	212
Florence,	123	132
Millan,	139	394
Genes,	291	414 Palms

Lions.

100 Aulns at Lions doe make at

London,	98	362	Ells.
Antwerp,	163	974	
Norembergh,	171	311	
Franckford,	204	918	
Dantzick,	136	065	
Vienna,	142	623	
Arras,	162	295	
Paris,	91	443	Aulnes.
Roan,	85	246	
Sivill,	132	791	Vares.
The Iles,	1 1	640	
Venice,	177	049	Braces.
Lucques,	196	721	
Florence,	200	819	
Millan,	226	229	
Genoa,	472	950	Paulms.

The agreement of measures at *Artas* with the measures at other places.

Paris,

London,	105	263	Elles.
Antwerp,	175	439	
Norembergh,	183	333	
Franckford,	219	298	
Dantzick,	145	615	
Vienna,	152	630	
Arras,	172	84	
Lions,	107	000	Aulnes.
Roan,	91	228	
Stoill	142	105	Yares.
The Fier,	108	793	
Venice,	189	474	Braces.
Lucques,	210	526	
Florence,	214	911	
Millan,	242	105	
Genoa,	506	136	Paulms.

Roan.

Roan.

100 Aulnes at Roan do make at

London,	115	384 Ells.
Antwerp,	192	307
Nuremberg,	200	961
Franckford,	240	384
Dantzick,	159	615
Vienna,	167	307
Arras,	190	384
Rome,	117	307 Aulnes
Paris,	109	615
Sivill,	155	769 Vares.
The Iles,	119	230
Venice,	207	592 Vraces.
Lucques,	230	768
Florence,	235	565
Millan,	265	384
Genoa,	554	807 Paulms

100 Vares at Sivill doe make at

Sivill.

100 Yards at Sivill doe make at

London,	74	074	Ells.
Antwerp,	123	457	
Nuremberg,	129	012	
Franckford,	154	321	
Dantzick,	102	469	
Vienna,	107	407	
Arras,	122	222	
Lions,	75	308	Aulnes.
Paris,	70	370	
Roan,	64	197	
The Iles,	76	543	Varas.
Venice,	133	333	Pyaces.
Lucques,	148	148	
Florence,	151	234	
Millan,	170	370	
Genoa,	356	174	Pasmes.

The Iles of Madere.

100 Vares at the Ile of Madere do make at

London,	96	772	Ells.
Antwerp,	161	296	
Nuremberg,	168	548	
Franckford,	201	613	
Dantzick,	133	871	
Vienna,	140	322	
Arras,	159	677	
Lions	98	387	Aulnes.
Paris,	91	935	
Roan,	83	871	
Seville	130	645	Vares.
Mentes,	174	226	Brasses.
Lucques,	193	443	
Florence,	197	903	
Pisa,	222	583	
Genoa,	465	226	Pauloes.

Venice.

100 Braces at Venice doe make at

London,	55	555	Ells.
Antwerp,	92	542	
Nuremberg,	96	790	
Franckford,	115	741	
Dantzick,	76	853	
Vienna,	80	055	
Arras,	91	666	
Lions,	56	481	Aulnes.
Paris,	52	777	
Roan,	48	148	
Sivill,	75	000	Vares.
The Iles,	57	407	
Lucques,	111	111	Braces.
Florence,	113	426	
Millan,	127	777	
Genoa.	266	018	Paulms.

Lucques.

100 Braces at Lucques do make at

London,	50	Ells.
Antwerp,	83	333
Nuremberg.	87	083
Franckfort,	104	166
Dantzick,	69	166
Vienna,	72	500
Arras,	82	500
Lions,	50	833 Aulnes.
Paris,	47	500
Roan,	43	333
Orleans,	67	500 Vares.
The Iles,	51	666
Venice,	90	000 Braces.
Florence,	102	083
Pisa,	115	000
Genoa.	140	416 Paums.

Florence.

100 Braces at Florence do make at

London,	48	979	Ells.
Antwerp,	81	632	
Nuremberg,	85	306	
Franckford,	102	940	
Dantzick,	67	755	
Vienna,	71	020	
Arras,	80	808	
Lions,	49	796	Aunes.
Paris,	46	530	
Roan,	42	449	
Stvill,	66	122	Vares.
The Iles,	50	615	
Venice,	88	163	Braces.
Lucques,	97	959	
Millan,	112	653	
Genoa.	235	510	Paums.

Millan.

100 Braces at Millan doe make at

London,	43	478	Ells.
Antwerp,	72	463	
Nuremberg,	75	724	
Franckford,	90	579	
Dantzick,	60	145	
Vienna,	63	043	
Arras,	70	174	
Lions,	44	202	Aulnes.
Paris,	41	217	
Roan,	37	680	
Sivill,	58	695	Vares.
The Iles.	44	926	
Venice,	78	260	Braces.
Lucques,	86	956	
Florence,	88	768	
Genoa,	209	058	Paulms.

The Agreement of Weights of divers Countries, the one with the other being reduced to an equality and drawne into Tables as followeth.

London.

112 pound weight at London do make at	Antwerp,	107	625
	Lisbone,	99	000
	Nuremberg,	100	500
	Roan,	98	000
	Lions,	118	500
	Paris,	102	250
	Diep,	100	250
	Geneva,	90	375
	Tolouse,	122	750
	Rochell,	124	875
	Marsellies,	124	250
	Stoill,	109	750
	Venice sut.	166	875
	Venice grof.	105	375
	Vienna,	89	375
	Prosiaw,	134	625
	Leibzick,	101	250
	Dantzick,	129	250
	Lubeck,	97	375
	Barcellone,	143	500
	Genoa,	157	250

Antwerp.

100 lib. at Antwerp makes at

London,	104	065
Lubborne,	91	986
Nuremberg,	93	371
Roan,	91	057
Lions,	110	104
Paris,	94	006
Diep,	93	147
Geneva,	83	972
Toulouse,	114	053
Rochell,	116	028
Marsellies,	115	447
Stvill,	101	974
Venice sm.	155	052
Venice grof.	97	969
Vienna,	83	043
Possiaw,	125	087
Leibzig,	94	076
Dantzick,	120	093
Lubeck,	90	476
Barcellona,	133	333
Genoa,	146	109

Franckford.

100 lib. at Liſhborne makes at	London,	113	131
	Antwerp,	108	713
	Nuremberg,	101	262
	Roan,	98	989
	Lions,	119	696
	Paris,	103	282
	Diep,	101	263
	Geneva,	91	288
	Toulouſe,	123	990
	Rochell,	120	136
	Marſeilles,	125	505
	Sivill,	110	858
	Venice lot,	168	561
	Venice groſ,	106	439
	Vienna,	90	277
	Breſlaw,	135	985
	Leibzick,	102	272
	Dantzick,	130	555
	Lubeck,	98	358
	Barcellone,	144	949
	Genoa,	158	838

The 100 weight at *Franckford* is equall unto the 100 weight at *Liſhborne*.

Nuremberg.

100 pound at Nuremberg makes at

London,	111	442
Antwerp,	107	089
Lisbonne,	98	508
Roan,	97	512
Lions,	117	910
Paris,	101	711
Diep,	99	751
Geneva,	89	927
Toulouse,	122	139
Rochell,	104	254
Marseilles,	123	632
Sivill,	109	204
Venice lit.	166	445
Venice groſ.	104	850
Vienna,	88	930
Prestaw,	133	955
Leipzick,	100	746
Dantzick,	128	607
Lubeck,	96	890
Barcellone,	142	786
Genoa.	156	467

Roan.

London,	114	285
Antwerp,	109	821
Lisbone,	101	020
Nuremberg,	102	551
Lions,	120	918
Paris,	104	336
Diep,	102	296
Geneva,	92	219
Toulouse,	125	255
Rochell,	127	485
Marsellies,	126	796
Sivill,	121	990
Venice fut.	170	178
Venice grof.	107	525
Vienna,	91	199
Pzeslaw,	137	347
Leibzick,	103	216
Dantzick,	131	898
Lubeck,	99	362
Barcellone,	146	530
Genoa.	160	459

100 lib. at Roan makes at

Lions.

100 lib. at Lions makes at	London,	95	063
	Antwerp,	90	823
	Lisbonne,	83	544
	Nuremberg,	84	810
	Roan,	82	700
	Paris,	86	287
	Diep,	84	599
	Geneva,	76	265
	Toulouse,	103	586
	Rochell,	105	380
	Marseilles,	104	850
	Sivill,	92	616
	Venice fut.	140	823
	Venice gros.	88	928
	Vienna,	75	422
	Preslaw,	113	607
	Leibzick,	85	443
	Dantzick,	109	072
	Lubeck,	82	173
	Barcellone,	121	097
	Genoa,	132	700

Paris.

100 lib. at Paris	London,	109	535
	Antwerp,	105	256
	Lisbone,	96	821
	Nuremberg,	98	329
	Roan,	95	843
	Lions,	115	892
	Diep,	98	044
	Geneva,	88	386
	Toulouse,	120	049
	Rochell,	122	146
	Marselles,	101	515
	Stvill,	107	364
	Venice fat.	163	203
	Venice graf.	103	056
	Vienna,	87	408
	Prestaw,	131	663
	Leibzick,	99	022
	Dantzick,	126	406
	Lubeck,	95	232
	Bayonne,	140	342
	Genoa,	153	789

The 100 weight at *Collen* and *Ausburge*, is equall to the 100 weight at *Paris*.

Diep.

100 lib. at Diep makes at	London,	111	720
	Antwerp,	107	357
	Lisbone,	98	753
	Nuremberg,	100	249
	Roan,	97	755
	Lions,	118	204
	Paris,	101	995
	Geneva,	90	149
	Toulouse,	122	443
	Rochell,	124	563
	Marseilles,	123	940
	Sivill,	109	476
	Venice sut.	166	458
	Venice grof.	105	112
	Vienna,	89	152
	Wratslaw,	134	288
	Leibzick,	100	997
	Dantzick,	128	927
	Lubeck,	97	132
	Barcellone,	143	042
	Genoa,	156	857

Geneva.

	London,	123	928
	Antwerp,	119	087
	Lisbonne,	109	543
	Nuremberg,	111	092
	Roan,	108	437
	Lions,	131	123
	Paris,	113	138
	Diep,	110	926
	Toulouse,	135	823
100 lib. at Geneva make at	Rochell,	138	174
	Marsellies,	137	482
	Sivill,	121	438
	Venice sut.	184	637
	Venice gros.	116	597
	Vienna,	98	893
	Prestaw,	148	962
	Leibzick,	112	028
	Dantzick,	143	015
	Lubeck,	107	745
	Barcellone,	158	782
	Genoa.	173	997

Toulouse.

London,	91	254
Antwerp,	87	678
Franckfort,	80	651
Nuremberg,	81	875
Roan,	79	878
Lions,	96	537
Paris,	83	299
Diep,	81	670
Geneva,	73	625
Rochell,	101	739
Marseilles,	101	220
Civill,	89	109
Venice ſm.	135	947
Venice groſ.	85	845
Vienna,	72	810
Breſlaw,	109	674
Leibzick,	82	484
Dantzick,	105	295
Lubeck,	79	022
Bartellone,	116	904
Genoa.	128	106

Rochell.

Rochell. M

London,	89	689
Antwerp,	86	187
Lisbone,	79	279
Nuremberg,	80	480
Roan,	78	478
Lions,	94	895
Paris,	81	882
Diep,	80	280
Geneva,	72	373
Toulouse,	98	298
Marseilles,	99	499
Sivill,	87	888
Venice sut.	133	638
Venice grof.	84	380
Vienna,	71	571
Pzeslaw,	107	807
Leibzick,	81	081
Dantzick,	103	503
Lubeck,	77	978
Barcelone,	114	914
Genoa.	125	925

100 lib. at Rochell doe make at

Marſeilles.

100 lib. at Marſeilles makes at

London,	90	140
Antwerp,	86	627
Liſhbone,	79	678
Nuremberg,	80	885
Roan,	78	873
Lions,	95	372
Paris,	82	293
Diep,	80	684
Genoua,	78	068
Toulouſe,	98	712
Rochell,	100	502
Sivill,	88	322
Venice ſut.	134	306
Venice groſ.	84	809
Vienna,	71	931
Wreſlaw,	108	350
Leibzick,	81	489
Dantzick,	104	024
Lubeck,	78	370
Barcellone,	115	493
Genoa.	126	558

London,	102	050
Antwerp,	98	063
[illegible]	90	205
Nuremberg,	91	571
Roan,	89	202
Lions,	107	972
Paris,	93	166
Diep,	91	161
Geneva,	82	346
Toulouse,	111	843
Rochell,	113	781
Marseilles,	113	212
Venice silv.	152	050
Venice geof.	96	014
Vienna,	81	435
Pzeslaw,	122	665
Leibzick,	92	255
Dantzick,	117	767
Lubeck,	88	724
Barcellona,	130	751
Genoa,	143	325

Venice ſuttle Weight.

100 lib. at Venice ſuttle weight makes at

London,	67	115
Antwerp,	64	494
Liſbborne,	59	325
Nurenberg,	60	224
Roan,	58	726
Lions,	71	011
Paris,	61	274
Diep,	60	074
Geneva,	54	157
Toulouſe,	73	558
Rochell,	74	831
Marſeilles,	74	457
Civill,	65	768
Venice groſ.	63	146
Vienna,	53	558
Pyeſtata,	80	674
Leibzick,	60	674
Dantzick,	77	453
Lubeck,	52	299
Barrellone,	85	992
Genoa,	94	232

Preslavi.

London,	83 | 195
Antwerp,	79 | 944
Lisbborne,	73 | 537
Nuremberg,	74 | 652
Roan,	72 | 795
Lions,	88 | 022
Paris,	95 | 951
Diep,	74 | 466
Geneva,	67 | 131
Tolouse,	91 | 679
Rochell,	92 | 757
Marseilles,	92 | 220
Stvill,	81 | 522
Venice sut.	123 | 955
Venice grof.	78 | 273
Vienna,	66 | 388
Leibzick,	75 | 209
Dantzick,	96 | 007
Lubeck,	72 | 330
Barcellona,	106 | 592
Genoa,	116 | 805

100 pound at Preslavi make at

Lelbzick.

100 pound at Lelbzick makes at	London,	110	617
	Antwerp,	106	296
	Lisshozne,	97	788
	Norenberg,	99	259
	Roan,	96	790
	Lions,	116	938
	Paris,	100	987
	Diep,	99	012
	Geneva,	89	259
	Tonlonle,	121	234
	Rochell,	123	333
	Marselles,	122	716
	Sivill,	108	395
	Venice sut.	164	814
	Venice grof.	104	074
	Vienna,	88	272
	Wreslaw,	132	963
	Dantzick,	127	654
	Lubeck,	96	172
	Barcellone,	141	827
	Genoa.	155	308

Dantzick:

100 lib. at Dantzick makes at	London,	86	653
	Antwerp,	83	268
	Lisbourne,	76	595
	Nuremberg,	77	756
	Roan,	75	822
	Lions,	91	683
	Paris,	79	110
	Diep,	77	563
	Genoua,	69	922
	Toulouse,	94	971
	Rochell,	96	615
	Marsilles,	96	131
	Sivill,	84	913
	Venice sm.	129	110
	Venice gros.	81	520
	Vienna,	69	148
	Prestaw,	104	158
	Leibzick,	78	336
	Lubeck,	75	337
	Barcellona,	111	025
	Genoa,	121	663

Lubeck.

100 lib. at Lubeck makes at

London,	115	019
Antwerp,	110	526
Lisbone,	101	667
Nuremberg,	103	209
Roan,	100	642
Lions,	121	694
Paris,	105	006
Diep,	102	952
Geneva,	92	811
Toulouse,	126	994
Rochell,	128	241
Marseilles,	127	609
Sivill,	112	708
Venice smal.	171	373
Venice groſ.	108	215
Vienna	91	784
Pzeslaw	138	254
Leibzig,	103	979
Dantzick,	132	734
Barcellone,	147	368
Genoa.	161	489

Barcellone.

100 lib. at Barcellone makes at	London,	78	048
	Antwerp,	75	000
	Lisbborne,	68	989
	Nuremberg,	70	061
	Roan,	68	290
	Lions,	82	578
	Paris,	71	254
	Diep,	69	860
	Geneva,	62	979
	Toulouse,	85	540
	Rochell,	87	021
	Marseilles,	86	585
	Sivill,	76	480
	Venice sut.	116	149
	Venice gros.	73	432
	Vienna,	62	282
	Preslaw,	93	118
	Leibzick,	70	557
	Dantzick,	90	061
	Lubeck,	67	857
	Genoa,	109	581

Genoa.

London,	71	224
Antwerp,	68	442
Lisbona,	62	957
Nurenberg,	63	910
Roan,	62	320
Lions,	75	357
Paris,	65	023
Diep,	63	752
Geneva,	57	478
Toulouse,	78	060
Rochell,	79	411
Marsellies,	79	014
Sivill,	69	793
Venice sal.	106	121
Venice groſ.	67	011
Vienna,	56	836
Prage,	85	612
Leibzick,	64	388
Dantzick,	82	194
Lubeck,	61	923
Barcellona,	91	272

100 lib. at Genoa weaken at

The 100 weight at *Aquila* is equall to the 100 weight at *Genoa*.

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The agreements of the measure and weights of divers places in *Europe*, the one with the other.

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BRITISH MUSEUM

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1928

THE

WELL-SPRING OF SCIENCES,

In TEACHING

The perfect worke and practise of ARITHMETICK, both in Numbers and Fractions.

Set forth

By HUMFREY BAKER, *Londoner.*

And now againe peruſed, augmented, and amended in all the Three Parts by the ſaid Authour.

Whereunto are alſo added certaine Tables of the agreement of Meaſures and Weights of diuers places in EUROPE the one with the other, as by the TABLE appeareth.

LONDON,
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sheweth which is the King; the vowell e, telleth which is the Duke; and the vowell i, sheweth which is the County: in following the order how, and to whom you have given 1 stone, to whom 2, and to which 3, then if there doe remaine but 1 stone, the first name *Angeli*, (by these 3 vowels a, e, i,) sheweth that Peter is King, James the Duke, and John the County. And if there doe remaine 2 stones, the second name *Beati*, shall shew you by these 3 vowels a, e, i, that Peter is the Duke, James the King, and John the County. And so of the other, as by this Table doth plainly appeare.

1,	2,	1,	2,	3,	3,
2,	1,	3,	3,	1,	2,
3,	3,	2,	1,	2,	1,
a,	e,	a,	e,	i,	i,
e,	a,	i,	i,	a,	e,
i,	i,	e,	a,	e,	a,
1,	2,	3,	5,	6,	7.
A.	*B.*	*T.*	*M.*	*I.*	*P.*

FINIS.

In the ensuing Tables, the figures towards the left hand of the line doe shew the number of Elles, Aulns, Mares, Braces or Paulms, which are equall to the 100 Elles, Aulns, Mares, Braces, or Paulms of the place named, over the head of the Table: And the figures to the right hand of the line doe shew the fractionary part and is are all numerators of fractions, whose common denominator is 1000. So that in this decimall way of accompt 750 is 3 quarters of an Ell, Aulne, Mare, &c. 500 is halfe an Ell, 250 is a quarter, and 175 is halfe a quarter, &c.

Example; at Lions the 100 Aulnes makes at Antwerp 163 Elles and 934 parts of an Ell divided into 1000 parts, substract from 934, 750, which is 3 quarters, and the remaine 184 which is lesse then a quarter, therefore take from it 175 which is halfe a quarter and there remains 009 as much as nothing: therefore the 100 Aulnes at Lions makes at Antwerp 163 Elles 3 quarters, and halfe quarter the like of any other.

As in the ensuing Tables the Ell is divided into 1000 so the pound is divided into the like parts, and therefore 750 in the fraction is 3 quarters of a pound or 12 ounces, 500 is halfe a pound or 8 ounces, 250 is a quarter or 4 ounces, and 175 is halfe a quarter or 2 ounces: But the way to value these equall fractions into ounces is by multiplying the numerator of the fraction by 16, and cut off 3 figures to the right hand, that which remaines to the left hand is ounc. Example, 100 ll. of Lions makes at Antwerp 90 ll. 813 parts of a pound which 813 multiplied by 16 the product is 13. 168, from which cut off three figures to the right hand; there remaine 13 ounces: Or seek the number 813 (or the neerest to it, lesse if it cannot be found) and against it to the right hand you shall find 13 ounces as before, and the like of any other number.

15	937.5
14	875.0
13	812.5
12	750.0
11	687.5
10	625.0
9	562.5
8	500.0
7	437.5
6	375.0
5	312.5
4	250.0
3	187.5
2	125.0
1	62.5

The

The Agreement of the Measures and Waights of divers Countries, the one with the other, being reduced to an equality, and drawn into Tables, as followeth.

London.

100 Ells at London doe make at

Antwerp,	166	667	Elles.
Nurembergs,	174	167	
Franckford,	208	333	
Dantzick,	138	333	
Vienna,	145	000	
Arras,	165		
Lions,	101	667	Aulnes.
Paris,	95	000	
Roan,	86	667	
Sivill,	135	000	Vares.
The Iles of Canaries,	103	333	
Venice,	108	000	Braces.
Lucques,	200	000	
Florence,	204	167	
Millan,	230	000	
Genoa,	480	833	Paulms

The *Vares* of *Lisbbourn* is equall to the Ell of *London*.

Antwerp.

100 Ells at Antwerp do make at	London,	60	Elles,
	Nuremberg,	104	500
	Frankford,	125	000
	Dantzick,	83	000
	Vienna,	87	200
	Arras,	99	000
	Lions,	61	Aunes.
	Paris,	57	000
	Roan,	52	
	Sivill,	81	Vares.
	The Iles,	62	
	Venice,	108	Braces.
	Lucques,	120	
	Florence,	122	5
	Millan,	138	
	Genoa,	288	5. Paulmes.

Nuremberg.

Nuremberg

100 Ells at Nuremberg do make at

London,	57	416	Ells
Antwerp,	95	694	
Franckford,	119	617	
Dantzick,	79	424	
Vienna,	83	253	
Arras,	94	736	
Lions,	58	373	Aulnes.
Paris,	54	545	
Rom,	49	760	
Sivill,	77	506	Varas.
The Iles,	59	330	
Venice,	103	292	Braces
Lucques,	114	832	
Florence,	117	225	
Millan,	132	057	
Genoa,	276	076	Paums

Franckford.

100 Ell at Franckford do make at

London,	48	100 Elles,
Antwerp,	80	100
Nuremberg,	83	648
Dantzick,	64	400
Vienna,	69	600
Arras,	79	200
Lions,	48	8 Aulnes.
Paris,	45	600
Roan,	41	600
Sivill,	64	8 Varas.
The Iles,	49	600
Venice,	86	4 Braces
Lucques,	96	100
Florence,	98	100
Millan,	110	440
Genoa,	230	8 Paulmes.

The Ell at *Liebsig* and *Preslau* is equall unto the Ell at *Franckford*.

Dantzick.

Dantzick.

London,	72	289	Ells.
Antwerp,	120	482	
Nuremberg,	125	903	
Franckford,	150	602	
Vienna,	104	819	
Arras,	112	0[illegible]8	
Lions,	73	494	Aulnes.
Paris,	68	602	
Roan,	62	650	
Sivill,	97	590	Vares.
The Iles,	74	699	
Venice,	130	120	Braces.
Lucques,	144	578	
Florence,	147	590	
Millan,	166	265	
Genoa.	347	590	Paulins.

Vienna.

100 Ells at Vienna do make at

London,	68	965	Ells.
Antwerp,	114	942	
Nuremberg,	120	114	
Francklore,	143	678	
Dantzick,	95	402	
Arras,	113	793	
Lions,	70	011	Aulnes.
Paris,	65	517	
Roan,	59	765	
Sivill,	93	103	Vares.
The Iles,	71	264	
Venice,	124	138	Braces.
Lucques,	137	930	
Florence,	140	108	
Millan,	158	620	
Genoa,	331	601	Paulms

Arras.

Arras.

100 Ells at Arras doe make at

London,	60	606	Ellen.
Antwerp,	101	610	
Nuremberg,	105	555	
Franckford,	126	262	
Dantzick,	83	838	
Vienna,	87	878	
Lions,	61	616	Aulnes.
Paris,	57	575	
Roan,	52	525	
Sivill,	80	180	Vares.
The Iles,	62	626	
Venice,	109	090	Braces.
Lucques,	121	212	
Florence,	123	131	
Millan,	139	394	
Genoa,	291	414	Paulms

Lions.

100 Lions at London do make at	London,	98	362	Ells.
	Antwerp,	163	934	
	Nuremberg,	171	311	
	Franckford,	204	948	
	Dantzick,	130	065	
	Vienna,	142	623	
	Arras,	162	295	
100 Lions at Paris do make at	Paris,	93	443	Aulnes.
	Roan,	85	246	
	Seville,	132	791	Yards.
	The Iles,	101	640	
	Venice,	177	049	Braces.
	Lucques,	196	721	
	Florence,	200	819	
	Millan,	226	229	
	Genoa,	472	950	Paulms.

The agreement of measures at *Arras* with the measures at other places.

Paris.

London,	105	263	Elles.
Antwerp,	175	439	
Norenberg,	183	333	
Franckford,	219	298	
Dantzick,	145	615	
Vienna,	152	630	
Arras,	173	684	
Lions,	107	000	Aulnes.
Roan,	91	228	
Sivill,	142	105	Vares.
The Ies,	108	793	
Venice,	189	474	Braces.
Lucques,	210	526	
Florence,	214	911	
Millan,	242	105	
Genoa,	506	136	Paulms.

100 Aulnes at Paris do make at

100

Roan.

100 Aulnes at Roan do make at

London,	115	384	Ells.
Antwerp,	192	307	
Nuremberg,	200	961	
Francfoord,	240	384	
Mantzick,	159	615	
Vienna,	167	307	
Arras,	190	384	
Lions,	117	307	Aulnes.
Paris,	109	615	
Sivill,	155	769	Mares.
The Iles,	119	230	
Venice,	207	692	Braces.
Lucques,	230	768	
Florence,	235	565	
Millan,	265	384	
Genoa,	554	807	Paulms

100 Mares at Sivill doe make at

Sivill.

Sivill.

100 Vares at Sivill doe make at	London,	74	074 Ells.
	Antwerp,	123	457
	Nuremberg,	129	012
	Franckford,	154	321
	Dantzick,	102	469
	Vienna,	107	407
	Arras,	122	222
	Lions,	75	308 Aulnes.
	Paris,	70	370
	Roan,	64	197
	The Iles,	76	543 Vares.
	Venice,	133	333 Braces.
	Lucques,	148	248
	Florence,	151	234
	Millan,	170	370
	Genoa,	356	174 Paulms

The

The Iles of Madere.

100 Vares at the Ile of Madere do make at

London,	96	772	Ells.
Antwerp,	161	290	
Nuremberg,	168	548	
Franckford,	201	613	
Dantzick,	133	871	
Vienna,	140	322	
Arras,	159	677	
Lions,	98	387	Aulnes.
Paris,	91	935	
Roan,	83	871	
Sevill,	130	645	Vares.
Venice,	174	226	Braces.
Lucques,	193	448	
Florence,	197	903	
Millan,	222	583	
Genoa,	465	226	Paulms.

100 Braces at Venice doe make at

Venice.

Venice.

100 Braces at Venice doe make at

London,	55	555	Ells.
Antwerp,	92	542	
Nuremberg,	96	790	
Franckford,	115	741	
Dantzick,	76	853	
Vienna,	80	055	
Arras,	91	666	
Lions,	56	481	Aunes.
Paris,	52	777	
Roan,	48	148	
Sivill,	75	000	Vares.
The Iles,	57	407	
Lucques,	111	111	Braces.
Florence,	113	426	
Millan,	127	777	
Genoa,	266	018	Paulms.

Lucques.

100 Braces at Lucques do make at			
London,	50		Ells.
Antwerp,	83	333	
Nuremberg.	87	083	
Franckford,	104	166	
Dantzick,	69	166	
Vienna,	72	500	
Arras,	82	500	
Lions,	50	833	Aulns.
Paris,	47	500	
Roan,	43	333	
Sevill,	67	500	Vares.
The Iles,	51	666	
Venice,	90	000	Braces.
Florence,	102	083	
Millan,	115	000	
Genoa,	140	416	Paulms.

Florence.

Florence.

100 Braces at Florence do make at

London,		48	979	Ells.
Antwerp,		81	632	
Nuremberg,		85	306	
Franckfort,		102	040	
Dantzich,		67	755	
Vienna,		71	020	
Arras,		80	808	
Rome,		49	796	Canes.
Paris,		46	530	
Roan,		42	449	
Venice,		66	122	Varas.
The Iles,		50	618	
Venice,		88	163	Brazes.
Lucques,		97	959	
Millan,		112	659	
Genoa,		235	510	Paulms.

Millan.

100 Yards at Millan doe make at

London,	43	478	Ells.
Antwerp,	72	463	
Nuremberg,	75	724	
Franckford,	90	579	
Dantzick,	60	145	
Vienna,	63	043	
Arras,	70	174	
Lions,	44	202	Aulnes.
Paris,	41	217	
Roan,	37	680	Aunes.
Seville,	58	695	
The Iles.	44	926	
Venice,	78	260	Brasses.
Lucques,	86	956	
Florence,	88	768	
Genoa,	109	058	Paulms.

The

The Agreement of Weights of divers Countries, the one with the other being reduced to an equality and drawne into Tables as follow...

London.

112 pound weight at London do make at

Antwerp,	107	625
Lisbone,	99	000
Nuremberg,	100	500
Roan,	98	000
Lions,	118	500
Paris,	102	250
Dieppe,	100	250
Geneva,	90	375
Tolouse,	122	750
Rochell,	124	875
Rotterdam,	124	250
Sivill,	109	750
Venice fat.	166	875
Venice groſ.	105	375
Vienna,	89	375
Prage,	134	625
Leibzick,	101	250
Dantzick,	129	250
Lubeck,		375
Barcellone,		500
Genoa,	157	250

The agreement of Weights,

Antwerp.

100 lib. at Antwerp makes at	London,	104	065
	Lubzoyne,	91	986
	Nuremberg,	93	371
	Roan,	91	057
	Lions,	110	104
	Paris,	94	006
	Diep,	93	147
	Geneva,	83	972
	Toulouse,	114	053
	Rochell,	116	028
	Marseilles,	115	447
	Sivill,	101	974
	Venice smal.	151	052
	Venice great.	97	909
	Vienna,	83	643
	Presburg,	125	087
	Leibzig,	94	076
	Dantzick,	120	093
	Lubeck,	90	476
	Barcelona,	133	333
	Genoa,	146	109

Franckford.

100 lib. at Lisbone makes at	London,	113	131
	Antwerp,	108	713
	Nuremberg,	101	262
	Roan,	98	989
	Lions,	119	696
	Paris,	103	282
	Diep,	101	263
	Geneva,	91	288
	Toulouse,	123	990
	Rochell,	126	136
	Marsellies,	125	505
	Sivill,	110	858
	Venice sm.	168	561
	Venice gro.	106	439
	Vienna,	90	277
	Presburg,	135	985
	Leibzick,	102	272
	Dantzick,	130	555
	Lubeck,	98	358
	Barcellona,	144	949
	Genoa,	158	838

The 100 weight at *Franckford* is equall unto the 190 weight at *Lisbone*.

Nuremberg.

100 pound at Nuremberg makes at

London,	111	442
Antwerp,	107	089
Lisbborne,	98	508
Roan,	97	512
Lions,	117	910
Paris,	101	711
Diep,	99	751
Geneva,	89	927
Toulouse,	122	139
Rochell,	124	254
Marselles,	123	632
Stvill,	109	204
Venice sut.	166	445
Venice grof.	104	850
Vienna,	88	930
Prestaw,	133	955
Leipsick,	100	746
Dantzick,	128	607
Lubeck,	96	890
Barcellone,	142	786
Genoa.	156	467

Roan.

100 lib. at Roan makes at

London,	114	285
Antwerp,	109	821
Lisbone,	101	020
Nurrimberg,	102	551
Lions,	120	918
Paris,	104	336
Diep,	102	296
Geneva,	92	219
Toulouse,	125	255
Rochell,	127	423
Marsellies,	126	796
Stvill,	111	990
Venice fut.	170	178
Venice grof.	107	525
Vienna,	91	199
Prestaw,	137	347
Leibzick,	103	216
Dantzick,	131	898
Lubeck,	99	362
Barcellona,	146	530
Genoa,	160	459

Lions.

100 lib. at Lions makes at	London,	95	063
	Antwerp,	90	823
	Lisbona,	83	544
	Nuremberg,	84	810
	Roan,	82	700
	Paris,	86	287
	Diep,	84	599
	Geneva,	76	265
	Toulouse,	103	586
	Rochell,	105	380
	Marsellies,	104	850
	Sivill,	92	616
	Venice fut.	140	823
	Venice gref.	88	928
	Vienna,	75	422
	Pezaro,	113	607
	Leibzick,	85	443
	Dantzick,	109	072
	Lubeck,	82	173
	Barcellona,	121	097
	Genoa,	132	700

Paris.

London,	109	535
Antwerp,	105	256
Lisbon,	96	821
Nuremberg,	98	329
Roan,	95	843
Lions,	115	892
Diep,	98	044
Geneva,	88	386
Toulouse,	120	049
Rochell,	123	446
Marsilles,	124	515
Sivill,	107	884
Venice small,	163	203
Venice great,	103	056
Vienna,	87	408
Prage,	131	663
Leipzick,	99	022
Dantzick,	126	406
Lubeck,	95	232
Marsilles,	140	342
Genoa,	153	789

100 lib. at Paris makes at

The 100 weight at *Collen* and *Ausburge*, is equall to the 100 weight at *Paris*.

Diep.

London,	111	720
Antwerp,	107	357
Lisbone,	98	753
Nuremberg,	100	249
Roan,	97	755
Lions,	118	204
Paris,	101	995
Geneva,	90	149
Toulouse,	122	443
Rochell,	104	563
Marsellies,	123	940
Stoll,	109	476
Venice sut.	166	458
Venice grof.	105	112
Vienna,	89	152
Breslaw,	134	288
Leibzick,	100	997
Dantzick,	128	927
Lubeck,	97	132
Barcellone,	143	042
Genoa,	156	857

Geneva,

Geneva.

100 lib. at Geneva make at	London,	123	928
	Antwerp,	119	087
	Lisbonne,	109	543
	Nuremberg,	111	092
	Roan,	108	437
	Lions,	131	123
	Paris,	113	138
	Diep,	110	926
	Toulouse,	135	823
	Rochell,	138	174
	Marseilles,	137	482
	Stvill,	121	438
	Venice sut.	184	637
	Venice grof.	116	597
	Vienne,	98	893
	Prestaw,	148	962
	Leibzick,	112	028
	Dantzick,	143	015
	Lubeck,	107	745
	Barcellona,	158	782
	Genoa,	173	997

Toulouse.

London,	91	254
Antwerp,	87	678
Franckford,	80	651
Nuremberg,	81	875
Roan,	79	878
Lions,	96	537
Paris,	83	299
Diep,	81	670
Geneua,	73	625
Rochell,	101	739
Marsellies,	101	239
Styll,	89	109
Venice sut.	135	947
Venice groſ.	85	845
Vienna,	72	810
Breſlaw,	109	674
Leibzick,	82	484
Dantzick,	105	295
Lubeck,	79	022
Barcellona,	116	904
Genoa.	128	106

100 lib. at Toulouse makes at

Rochell.

Rochell.

	London,	89	689
	Antwerp,	86	187
	Lisbone,	79	279
	Nurenberg,	80	480
	Roan,	78	478
	Lions,	94	895
	Paris,	81	881
	Diep,	80	280
	Geneva,	72	373
100 lib. at Rochell doe make at	Toulouse,	98	298
	Marseilles,	99	499
	Sivill,	87	888
	Venice sut.	133	638
	Venice groſ.	84	380
	Vienna,	71	571
	Prestadt,	107	807
	Leibzick,	81	681
	Dantzick,	103	503
	Lubeck,	77	978
	Barcellona,	114	914
	Genoa.	125	925

Marseilles.

100 lib. at Marseilles makes at

London,	90	140
Antwerp,	86	627
Lisbone,	79	678
Nuremberg,	80	885
Roan,	78	873
Lions,	95	372
Paris,	82	293
Diep,	80	684
Geneva,	78	068
Toulouse,	98	712
Rochell,	100	502
Sivill,	88	322
Venice sut.	134	306
Venice gros.	84	809
Vienna,	71	931
Pzellaw,	108	350
Lesbzick,	81	489
Dantzick,	104	024
Lubeck,	78	370
Barcellona,	115	493
Genoa.	106	558

Sivill.

London,	102	059
Antwerp,	98	063
Lisbon,	90	205
Nuremberg,	91	571
Roan,	89	202
Lions,	107	972
Paris,	93	166
Diep,	91	161
Geneva,	82	346
Toulouse,	111	845
Rochell,	113	781
Marsellies,	113	214
Venice sil.	152	058
Venice gros.	96	014
Vienna,	81	435
Prage,	122	665
Leipzick,	92	255
Dantzick,	117	767
Lubeck,	88	724
Bartellona,	130	751
Genoa,	143	325

100 lib. at Sivill make at

32.

Venice suttle Weight.

100 lib. at Venice suttle weight makes at	London,	67	115
	Antwerp,	64	494
	Lishborne,	59	325
	Nuremberg,	60	224
	Roan,	58	726
	Lions,	71	011
	Paris,	61	274
	Diep,	60	074
	Geneva,	54	157
	Toulouse,	73	558
	Rochell,	74	831
	Marseilles,	74	457
	Sivill,	65	768
	Venice gros.	63	146
	Vienna,	53	558
	Pressaw,	80	674
	Leibzick,	60	674
	Dantzick,	77	453
	Lubeck,	52	299
	Barcellone,	85	992
	Genoa,	94	232

Venice.

Venice grosse Weight.

100 lib. at Venice grosse weight makes at	London,	106	287
	Antwerp,	102	135
	Lishborne,	93	950
	Nuremberg,	95	373
	Roan,	93	001
	Lions,	112	465
	Paris,	97	034
	Diep,	95	136
	Geneva,	85	765
	Toulouse,	116	489
	Rochell,	118	505
	Marseilles,	117	912
	Sivill,	104	151
	Venice sut.	158	363
	Vienna,	84	816
	Preslaw,	127	758
	Leibzig,	96	085
	Dantzick,	122	742
	Lubeck,	92	408
	Barcellone,	126	275
	Genoa,	149	229

Vienna.

London,	125	315
Antwerp,	120	420
Lisbone,	110	769
Nurenberg,	112	447
Roan,	109	650
Lions,	132	598
Paris,	114	405
Diep,	112	168
Geneva,	161	118
Toulouse,	137	343
Rochell,	139	720
Marselles,	139	021
Stoll,	122	797
Venice sut.	186	712
Venice groſ.	117	902
Preſlaw,	150	629
Leibzick,	113	286
Dantzick,	144	615
Lubeck,	108	951
Barcellone,	160	55
Genoa,	175	943

Preslaw.

100 pound at Preslaw make at

London,	83	195
Antwerp,	79	944
Lisbone,	73	537
Nuremberg,	74	652
Rom,	72	795
Lions,	88	012
Paris,	95	951
Diep,	74	466
Geneua,	67	131
Tolouse,	91	179
Rochell,	92	757
Marseilles,	92	220
Stoell,	81	522
Venice fat.	123	955
Venice grof.	78	273
Vienna,	66	388
Leibzich,	75	209
Dantzick,	96	007
Lubeck,	72	330
Barcellona,	106	592
Genoa,	116	805

Leibzick.

100 pound at Leibzick makes at	London,	110	617
	Antwerp,	106	296
	Lishborne,	97	788
	Nuremberg,	99	259
	Roan,	96	790
	Lions,	116	938
	Paris,	100	987
	Diep,	99	012
	Geneva,	89	259
	Toulouse,	121	234
	Rochell,	123	333
	Marseilles,	122	716
	Sivill,	108	395
	Venice sut.	164	814
	Venice gros.	104	074
	Vienna,	88	272
	Preslaw,	132	963
	Dantzick,	127	654
	Lubeck,	96	172
	Barcellone,	141	827
	Genoa.	155	308

Dantzick:

100 lib. at Dantzick makes at	London,	86	653
	Antwerp,	83	268
	Lisbborne,	76	595
	Nuremberg,	77	756
	Roan,	75	822
	Lions,	91	683
	Paris,	79	110
	Diep,	77	563
	Geneva,	69	922
	Toulouse,	94	971
	Rochell,	96	615
	Marseilles,	96	131
	Sivill,	84	913
	Venice sm.	129	110
	Venice gros.	81	520
	Vienna,	69	148
	Prage,	104	158
	Lesbzick,	78	336
	Lubeck,	75	337
	Marcellens,	111	025
	Genoa.	121	663

Lubeck.

100 lib. at Lubeck makes at

London,	115	019
Antwerp,	110	526
Lisbone,	101	667
Norenberg,	103	209
Roan,	100	642
Lions,	121	694
Paris,	105	006
Diep,	102	952
Geneva,	92	811
Toulouse,	126	059
Rochell,	118	241
Marsilles,	127	609
Sivill,	112	708
Venice sut.	171	373
Venice gros.	108	215
Vienna,	91	784
Prage,	138	254
Leibzig,	103	979
Dantzick,	132	734
Barcellone,	147	368
Genoa,	161	489

Barcellone.

100 lib. at Barcellone makes at	London,	78	048
	Antwerp,	75	000
	Lisbonne,	68	989
	Norembergh,	70	061
	Roan,	68	290
	Lions,	82	578
	Paris,	71	254
	Diep,	69	860
	Geneva,	62	979
	Toulouse,	85	540
	Rochell,	87	021
	Marsellias,	86	985
	Sivill,	76	480
	Venice smal.	116	149
	Venice great	73	432
	Vienna,	62	282
	Prestaw,	93	118
	Leibzick,	70	557
	Dantzick,	90	061
	Lubeck,	67	857
	Genoa,	109	581

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Genoa.

100 lib. at Genoa makes at	London,	71	224
	Antwerp,	68	442
	Lisbonne,	62	957
	Nuremberg,	63	910
	Roan,	62	320
	Lions,	75	357
	Paris,	65	023
	Diep,	63	752
	Geneva,	57	478
	Toulouse,	78	060
	Rochell,	79	411
	Marseilles,	79	014
	Sivill,	69	793
	Venice lat.	106	121
	Venice gros,	67	011
	Vienna,	56	836
	Preslaw,	85	612
	Leibzick,	64	388
	Dantzick,	82	194
	Lubeck,	61	923
	Barcellone,	91	272

The 100 weight at *Aquila* is equall to the 100 weight at *Genoa*.

Hee

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